

Appendix C

Health and Safety Plan

**LOWER DUWAMISH WATERWAY PRE-DESIGN
INVESTIGATION - QUALITY ASSURANCE PROJECT
PLAN:
APPENDIX C: HEALTH AND SAFETY PLAN**

DRAFT

Prepared for

Lower Duwamish Waterway Group

For submittal to

US Environmental Protection Agency

November 14, 2019

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Title and Approval Page: LDW Pre-Design Investigation Health and Safety Plan

By their signature, the undersigned certify that this health and safety plan is approved and that it will be used to govern health and safety aspects of fieldwork described in the quality assurance project plan to which it is attached.

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Date

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Date

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Corporate Health and Safety Manager

Date

Thai Do
Windward Field Coordinator/Health and Safety Officer

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Matt Woltman
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Date

HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT FORM

Project Number: 180067-02.01

Project Name: Lower Duwamish Waterway Remedial Design

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan (HSP). For non-Anchor QEA and Windward employees, this HSP may include company-specific appendices to this plan developed by entities other than Anchor QEA and Windward.

Date	Name (print)	Signature	Company

Site Emergency Procedures

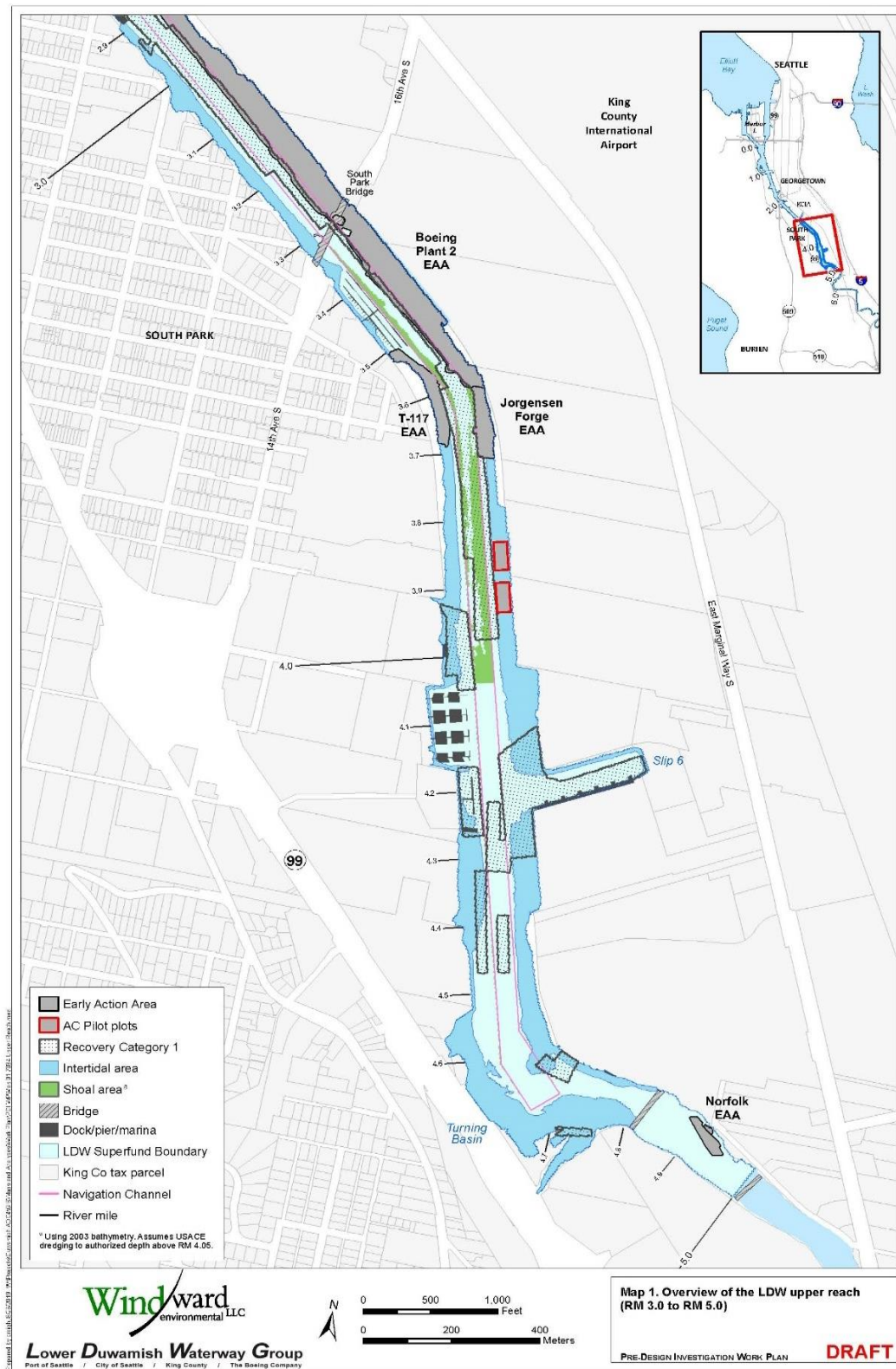


Figure C-i. General site location overview

EMERGENCY CONTACT INFORMATION

Table C-i. Site emergency form and emergency phone numbers

Category	Information	
Possible Chemicals of Concern	Metals, PCBs, PAHs, dioxin/furans, hydrogen sulfide	
Minimum Level of Protection	Modified Level D PPE	
Site(s) Location Address	Lower Duwamish Waterway, Seattle, Washington	
Emergency Phone Numbers		
Ambulance	911	
Fire	911	
Police	911	
Poison Control	(800) 222-1222	
PM	Tom Wang	Office: (206) 903-3314 Cell: (206) 465-0900
Windward FC/H&S Coordinator	Thai Do	Office: (206) 812-5407 Cell: to be provided
Anchor QEA FC/H&S Coordinator	Matt Woltman	Office: (206) 903-3327 Cell: to be provided
Anchor QEA CHSM	David Templeton	Office: (206) 287-9130 Cell: (206) 910-4279
	Gloria Palermo	Cell: (315)-622-3723
USCG	Emergency: (206) 286-5400 General Information: (206) 442-5295 VHF Channel 16	
Ecology NW Region Spill Response (24hr emergency line)	(206) 649-7000	

In the event of any emergency, contact the PM and FC.

For local resources, please visit: <http://www2.epa.gov/emergency-response/emergency-response-my-community>.

The National Response Center hotline is 1-800-424-8802.

CHSM – Corporate Health and Safety Manager

Ecology – Washington State Department of Ecology

FC – field coordinator

PCB – polychlorinated biphenyls

PAH – polycyclic aromatic hydrocarbons

PM – project manager

PPE – personal protective equipment

USCG – US Coast Guard

Table C-ii. Hospital information

Category	Information
Hospital Name	Harborview Medical Center
Address	325 9th Avenue
City, Province	Seattle, Washington 98104
Phone	(206) 323-3074
Emergency Phone	911

HOSPITAL ROUTE MAP AND DRIVING DIRECTIONS

The name, address, and telephone number of the hospital that will be used to provide medical care is as follows:

Harborview Medical Center
325 - 9th Avenue
Seattle, WA
206.323.3074

Directions from the vicinity of the LDW to Harborview Medical Center are as follows (Figure A-ii):

From the Duwamish River boat ramp (at South River Street, beneath the 1st Avenue South bridge):

- ◆ Drive east on South River Street.
- ◆ Turn left on Occidental Avenue South.
- ◆ Turn left on East Marginal Way South.
- ◆ Turn right on South Michigan Street.
- ◆ Look for entrance ramps to I-5 Northbound.
- ◆ Drive north on I-5.
- ◆ Take the James Street exit.
- ◆ Drive east on James Street to 9th Avenue.
- ◆ Turn right on 9th Avenue.
- ◆ Emergency entrance will be two blocks south on the right.

From the Harbor Island Marina (1001 Southwest Klickitat Way):

- ◆ From marina parking lot, turn sharp right onto Klickitat Way Southwest.
- ◆ Turn slight right onto Southwest Spokane Street
- ◆ Turn slight left to take the ramp toward WA-99 N/I-5/Columbian Way.
- ◆ Keep left at the fork in the ramp.
- ◆ Stay straight to go onto West Seattle Bridge.
- ◆ Merge onto I-5 North via the ramp on the left.
- ◆ Take the James Street exit.
- ◆ Head east on James Street to 9th Avenue.
- ◆ Turn right on 9th Avenue.
- ◆ Emergency entrance will be two blocks south on the right.

From South Park Marina (8604 Dallas Ave South):

- ◆ From marina parking lot, turn right onto Dallas Avenue South.
- ◆ Turn right onto 16th Avenue South.
- ◆ Turn left on East Marginal Way South.
- ◆ Look for entrance ramps to I-5 Northbound.
- ◆ Drive north on I-5.
- ◆ Take the James Street exit.
- ◆ Drive east on James Street to 9th Avenue.
- ◆ Turn right on 9th Avenue.
- ◆ Emergency entrance will be two blocks south on the right.

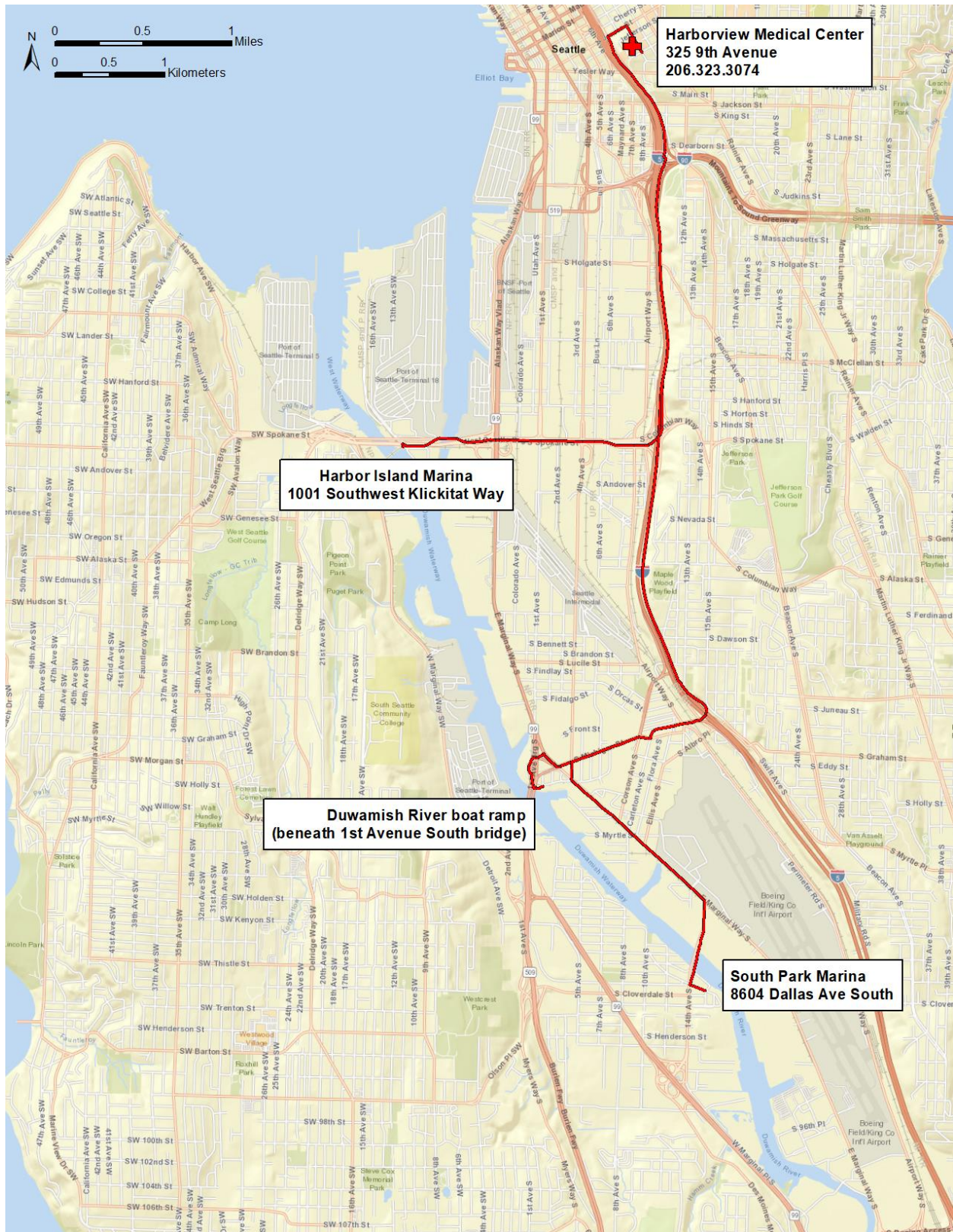


Figure C-ii. Hospital route map

PERSONAL INCIDENT RESPONSE PROCEDURES

In the event of an emergency, immediate action must be taken by the first person to recognize the event. Use the following steps as a guideline and refer to Figure A-iii:

- ◆ Survey the situation to verify that it is safe for you and the victim. Do not endanger your own life. Do not enter an area to rescue someone who has been overcome unless properly equipped and trained. Verify that all protocols are followed.
- ◆ Call the appropriate emergency number (911, if available) or direct someone else to do this immediately (see Table A-i). Explain the physical injury, chemical exposure, fire, or release and location of the incident.
- ◆ Have someone retrieve the nearest first aid kit (containing appropriate items for the particular work scope) and Automated External Defibrillator (AED), if available. Note: Only use an AED if you have been properly trained and are currently certified to do so.
- ◆ Decontaminate the victim without delaying life-saving procedures.
- ◆ Administer first aid and cardiopulmonary resuscitation (CPR), if properly trained, until emergency responders arrive.
- ◆ In the event that evacuation is required, the FL must perform a head count to verify that all Anchor QEA and Windward personnel are accounted for.
- ◆ Notify the Field Coordinator (FC) and Project Manager (PM); the PM will notify the client contact. The PM will also contact the Corporate Health and Safety Manager (CHSM). The CHSM will facilitate the incident investigation. All client requirements pertinent to personal incident reporting will also be adhered to.
- ◆ Complete the appropriate incident investigation reports.

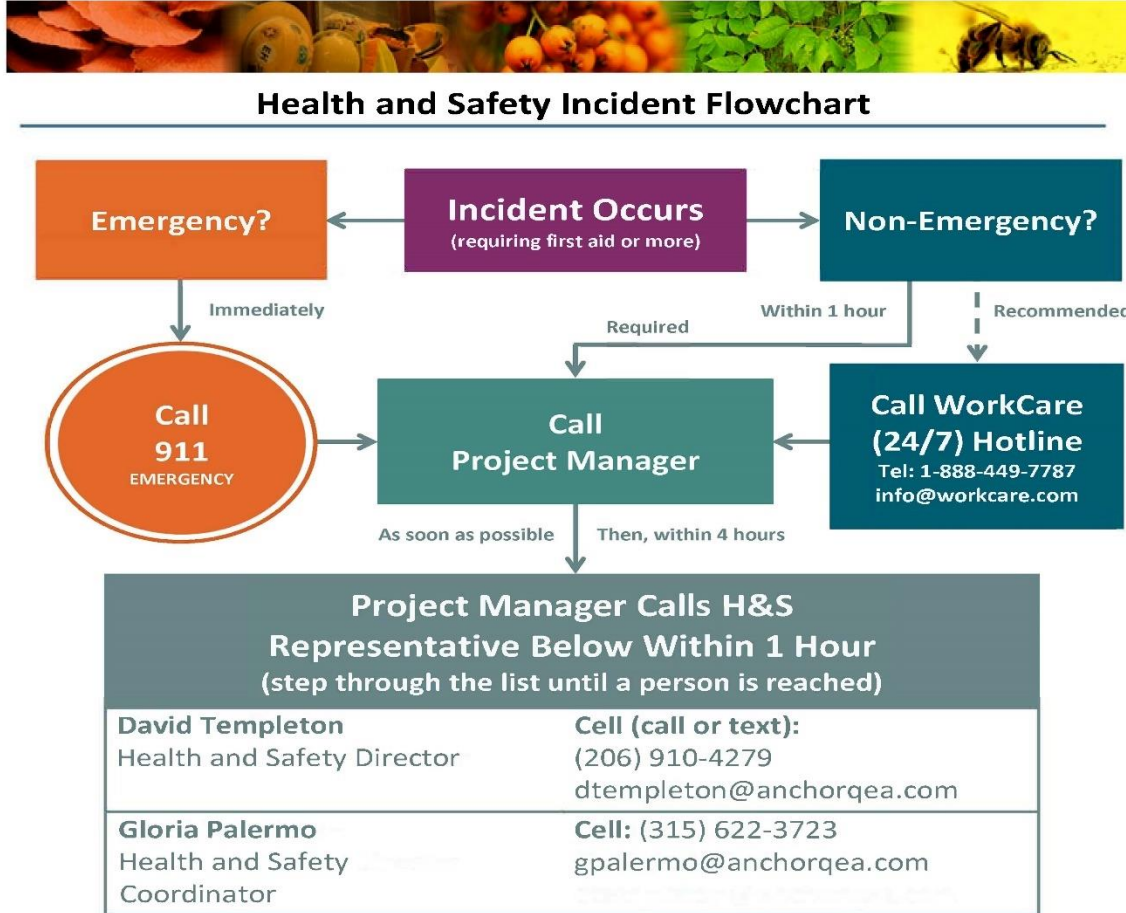


Figure C-iii. Incident flowchart

NON-PERSONAL INCIDENT RESPONSE PROCEDURES

All incidents including, but not limited to, fire, explosion, property damage, or environmental release will be responded to in accordance with the site-specific HSP. In general, this includes securing the site appropriate to the incident, turning control over to the emergency responders, or securing the site and summoning appropriate remedial personnel or equipment. Anchor QEA will immediately notify the client of any major incident, fire, equipment or property damage, or environmental incident with a preliminary report. A full report will be provided within 72 hours.

Spills and Releases of Hazardous Materials

- ◆ When required, notify the National Response Center Hotline (800-424-8802) and the US Coast Guard (USCG) (206-286-5400; VHF Channel 16). The following information should be provided: Name and telephone number
- ◆ Name and address of incident location

- ◆ Time and type of incident
- ◆ Name and quantity of materials involved, if known
- ◆ Extent of injuries
- ◆ Possible hazards to human health or the environment outside of the facility

If hazardous waste is released or produced through control of the incident, verify the following:

- ◆ Waste is collected and contained
- ◆ Containers of waste are removed or isolated from the immediate site of the emergency
- ◆ Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided
- ◆ No waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed

Verify that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

NEAR-MISS REPORTING

All near-miss incidents (i.e., those that could have reasonably led to an injury, environmental release, or other incident) must be reported to the FL and PM immediately, so action can be taken to verify that such conditions that led to the near-miss incident are readily corrected to prevent future occurrences.

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Attachments

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Attachment 2.	Daily Safety Briefing Form and Job Safety Analysis Sheets

Acronyms

CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
EPA	US Environmental Protection Agency
FC	field coordinator
HSM	health and safety manager
HSO	health and safety officer
HSP	health and safety plan
JSA	job safety analysis
LDW	Lower Duwamish Waterway
OSHA	Occupational Safety and Health Administration
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PFD	personal flotation device
PM	project manager
PPE	personal protective equipment
QAPP	quality assurance project plan
SVOC	Semivolatile organic compound
TCDD	tetrachlorodibenzo- <i>p</i> -dioxin
USCG	US Coast Guard
WAC	Washington Administrative Code
Windward	Windward Environmental LLC

1 Introduction

This site-specific health and safety plan (HSP) describes safe working practices for conducting field activities at potentially hazardous sites and for handling potentially hazardous materials/waste products. This HSP covers elements specified in 29 Code of Federal Regulations (CFR) 1910§120 and the Washington Administrative Code (WAC) Chapter 296-843. The procedures and guidelines contained herein are based on generally recognized health and safety practices. Any changes or revisions to this HSP will be made by a written amendment that will become a permanent part of this document. The goal of this HSP is to establish procedures for safe working practices for all field personnel and visitors.

This HSP addresses all field activities associated with the pre-design sampling in the upper reach of the Lower Duwamish Waterway (LDW). During site work, this HSP is to be implemented by the field coordinator (FC), who is also the designated site health and safety officer (HSO), in cooperation with the Anchor QEA, LLC (Anchor QEA) health and safety manager (HSM) and the Anchor QEA and Windward Environmental, LLC (Windward) project managers (PMs). All personnel involved in fieldwork on this project are required to comply with this HSP. The contents of this HSP reflect anticipation of the types of activities to be performed, knowledge of the physical characteristics of the site, and consideration of preliminary chemical data from previous investigations at the site. This HSP may be revised based on new information and/or changed conditions during site activities. Revisions will be documented in the project records.

This HSP will be modified by amendment, if necessary, to address changing field conditions or additional work tasks not already described in this document. Modifications will be proposed by the FC using the modification to HSP form included as Attachment 1. Modifications will be reviewed by the HSM or authorized representative and approved by the PM.

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2 Site Description and Project Scope

2.1 SITE DESCRIPTION

The sampling area is in the upper reach of the LDW (see Figure A-i). The QAPP to which this HSP is appended provides complete details of the sampling program. This section summarizes the types of work that will be performed during field activities.

2.2 SCOPE OF WORK

Design sampling will be conducted in phases. Phase I will focus on defining the extent of sediment remedial action level (RAL) exceedances in sediment in order to identify initial remedial action areas and make initial technology assignments. Phase II will consist of the collection of data for potential additional RAL delineation, for assessment of vertical contamination in dredging/capping areas, and for obtaining area-specific information needed for design. Phase III will be conducted if data gaps remain after Phase II. Specific activities included in the QAPP are as follows:

- ◆ Collection of sediment samples from a boat using a pneumatic grab sampler
- ◆ Collection of sediment core samples from a boat using a vibracorer
- ◆ Collection of sediment samples under pier areas (if feasible) by divers¹
- ◆ Collection of sediment samples from intertidal areas using a shovel or hand corer
- ◆ Collection of soil samples from bank areas using pneumatic grab sampler, vibracorer, divers, or shovel or hand corer (dependent on bank location and elevation)
- ◆ Sample handling, processing, and shipping
- ◆ Collection of geotechnical data from a barge using a hollow-stem auger drilling rig or cone penetrometer sampling rig
- ◆ Visual inspection of banks from a vessel or from walking the shoreline in a subset of the areas
- ◆ Inspection of structures (via observations from a vessel, diver inspection or shoreline access), verification of utility locations, and assessment of thickness of sediment on top of riprap layers (via hand digging or use of jet probes)

Additional details on sampling design and methods are provided in Sections 4 and 5 of the QAPP.

¹ If divers are used, a site-specific dive HSP will be developed prior to fieldwork initiation.

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3 Health and Safety Personnel

Key health and safety personnel and their responsibilities are described below. These individuals are responsible for the implementation of this HSP; they will be responsible for informing all individuals who are assigned to work on the site, or who visit the site, of the contents of this plan, and for ensuring that each person signs the Health and Safety Plan Acknowledgment Form (see front matter). By signing the Health and Safety Plan Acknowledgment Form, individuals recognize the site health and safety hazards, known or suspected, and agree to adhere to the protocols required to minimize exposure to such hazards.

Project Managers: The Anchor QEA PM will have overall responsibility for the successful outcome of the project. The PM will ensure that adequate resources and budget are provided for the health and safety staff to carry out their responsibilities during fieldwork. In consultation with the HSM, the PM will make final decisions concerning implementation of the HSP and resolution of site health and safety issues. The PM will report directly to LDWG. The Windward PM will ensure proper implementation of the QAPP.

Field Coordinator/Health and Safety Officer: The FC/HSO will direct field sampling activities, coordinate the technical components of the field program with health and safety components, and ensure that work is performed according to the QAPP.

The FC/HSO will implement this HSP at the work location, and will be responsible for all health and safety activities and the delegation of duties to a health and safety technician in the field, if appropriate. The FC/HSO will also have stop-work authority, to be used if there is an imminent safety hazard or potentially dangerous situation. The FC/HSO or his designee will be present during sampling and operations.

Corporate Health and Safety Manager: The CHSM will have overall responsibility for preparation, approval, and revisions of this HSP. The HSM will not necessarily be present during fieldwork, but will be readily available, if required, for consultation regarding health and safety issues during fieldwork.

Field Crew: All field crew members must be familiar and comply with the information in this HSP. They will also have the responsibility to report any potentially unsafe or hazardous conditions to the FC/HSO immediately. All field crew members will also have stop-work authority, to be used if there is an imminent safety hazard or potentially dangerous situation.

Site Visitors: Authorized visitors may come to the site to observe the sample collection/inspection activities. Visitors may be from the city, state, and federal regulatory and resource agencies that have a specific interest in the project, or visitors may be invited by the client, site contractors, or regulatory agencies. Visitors will be briefed on the hazards of the site, contents of the site-specific HSP, site safety rules, hazard control measures, and required personal protective equipment (PPE). They will

be escorted at all times by the field coordinator or a designated representative when entering work areas to observe the operations. Visitors will be expected to comply with all of the site health and safety requirements.

4 Hazard Evaluation and Control Measures

This section covers potential physical and chemical hazards that may be associated with the proposed project activities, and presents control measures for addressing these hazards. An activity hazard analysis table, summarizing the potential hazards associated with each site activity and the recommended site controls for minimizing each potential hazard is presented in Section 4.3.

Confined space entry will not be necessary for this project. Therefore, hazards associated with this activity are not discussed in this HSP.

4.1 PHYSICAL HAZARDS

For this project, it is anticipated that physical hazards will present a greater risk of injury than chemical hazards. Physical hazards are identified and discussed below.

4.1.1 Slips, trips, and falls

As with all field work, caution should be exercised to prevent slips on slick surfaces. In particular, sampling from a boat or other floating platform requires careful attention to minimize the risk of falling down or overboard. Extra care should be used in rainy conditions or on the shoreline where slick rocks or debris can be found. Slips can be minimized by wearing boots with good tread, made of material that does not become overly slippery when wet.

Trips are always a hazard on the uneven deck of a boat, in a cluttered work area, or in the intertidal zone where uneven substrate is common. Personnel will keep work areas as free as possible from items that interfere with walking.

Falls may be avoided by working as far from exposed edges as possible, by erecting railings, and by using fall protection when working on elevated platforms. For this project, open hatches may present a fall hazard, so hatches will remain closed when not being accessed for storage. Personnel should be aware of the area around any open hatches and use extra caution when accessing them.

4.1.2 Sampling equipment deployment

A pneumatic grab sampler deployed from a sampling vessel will be used to collect surface sediment samples and a vibracorer deployed from a sampling vessel will be used to collect subsurface sediment cores. These sampling devices and the mechanical equipment used to deploy the devices, such as motorized winches, may have rotating and reciprocating parts that if left unguarded, could pose hazards. Before sampling activities begin, there will be a training session for all field personnel to identify the potential hazards of the equipment and deployment devices onboard the sampling vessel. To control these hazards, work areas will be inspected to identify any potential pinch, grab, crush, and struck-by hazards. All field personnel will use caution and be aware of overhead and gear hazards such as the grab sampler, vibracorer, and A-frame.

All field personnel will wear a hard hat and modified Level D PPE when working on deck. Corrective actions may involve installing guards over exposed, rotating parts; isolating or de-energizing equipment; establishing exclusion zones around high-hazard areas; and constructing guardrails around mechanical equipment to prevent inadvertent contact. Until such time as these hazards can be controlled or eliminated, project team members will avoid working in any areas where the hazard exists. For locations that cannot be accessed from a vessel, samples will be hand-collected using a stainless steel spoon, hand corer or shovel.

4.1.3 Falling overboard

Most sampling activities will be conducted from a boat. As with any work from a floating platform, there is a chance of falling overboard. USCG-approved Type II or III personal flotation devices (PFDs) will be worn while working on the deck of the boat. If a person falls overboard into the water, a life ring will be thrown to the person immediately. One onboard person (a spotter) will keep an eye on the victim and shout the distance (boat lengths) and direction (o'clock) of the victim from the vessel. All work will stop and the vessel will be used to retrieve the person in the water; the person in the water will be approached from downstream.

4.1.4 Manual lifting

Equipment and samples must be lifted and carried. Back strain can result if lifting is done improperly. During any manual handling tasks, personnel should lift with the load supported by their legs and not their backs. For heavy loads, an adequate number of people will be used, or if possible, a mechanical lifting/handling device will be used.

4.1.5 Heat stress

Heat stress could be an issue during hot days. Heat-related problems include heat rash, heat cramps, heat exhaustion, and heat stroke. The causes, symptoms, and first aid recommended by the National Institute for Occupational Health and Safety for each type of heat stress category are summarized in Table A-1. Workers should be aware of the key differences between the signs and symptoms of heat stroke and those of heat exhaustion, such as the lack of sweating, the color of the skin (red), and the rise in body temperature associated with the former. Heat stroke is a medical emergency that requires immediate medical attention.

Table C-1. Heat stress symptoms and recommended first aid

Type of Heat Stress	Cause	Symptoms	First Aid
Heat rash	Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.	Formation of rash (red cluster of pimples or small blisters) usually on	Try to work in a cooler, less humid environment when possible.

Type of Heat Stress	Cause	Symptoms	First Aid
		the neck and upper chest, in the groin, under the breasts, and/or in elbow creases.	Keep the affected area dry. Dusting powder may be used to increase comfort.
Heat cramps	Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles cause painful cramps. Heat cramps may also be a symptom of heat exhaustion.	Muscle pain or spasms, usually in the arms, legs, and abdomen.	Have the person stop working and move him or her to a cool, shady area.
			Have the person drink clear juice or a sports beverage. Do not let person return to work until a few hours after cramps subside.
			Seek medical attention immediately if: (1) the person has heart problems, (2) the person is on a low sodium diet, or (3) the cramps do not subside within 1 hour.
Heat exhaustion	Heat exhaustion is the body's response to an excessive loss of water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those who are elderly or have high blood pressure, and those working in a hot environment.	Heavy sweating, extreme weakness or fatigue, dizziness or confusion, nausea, clammy moist skin, pale or flushed complexion, muscle cramps, slightly elevated body temperature, and fast and shallow breathing.	Have the person stop working and move him or her to a cool, shady area.
			Give the person plenty of water, juice, or other cool nonalcoholic beverages to drink.
			Have the person take a cool shower, bath, or sponge bath.
Heat stroke	Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature: the body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.	Hot dry skin (no sweating), hallucinations, chills, throbbing headache, high body temperature, confusion/dizziness, and slurred speech.	Call 911 immediately.
			Have the person stop working and move him or her to a cool, shady area.
			Cool the person using methods such as (1) soaking person's clothes with water, (2) spraying, sponging, or showering person with room temperature water, and/or (3) fanning person's body. Ice or cold packs may also be used.

Source: CDC (2018), as modified in Amec et al. (2015).

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4.1.6 Cold stress

Hypothermia occurs when the body's core temperature falls below 95°F. There is a risk of hypothermia if a crew member fails to dress warmly in cold weather, gets wet from rain or splashes, or falls into the water. To prevent hypothermia, all personnel will wear protective clothing appropriate for the weather conditions and physical activity. The FC/HSO will monitor all crew members for early symptoms of hypothermia (e.g., shivering, muscle incoordination, mild confusion). If such symptoms are observed, the FC/HSO will take immediate steps to reduce heat loss by providing extra layers of clothing, or by temporarily moving the affected crew member to a warmer environment. Other immediate steps that can be taken to reduce the symptoms of hypothermia include minimizing exposure to cold and wet conditions, limiting sitting or standing still for long periods, rehydration with warm fluids, and the removal of any wet outer layers of clothing to permit sweat evaporation during rest periods in a warm environment.

Sampling operations and conditions that might result in the occurrence of frostbite are not anticipated. The sampling will take place during the time of year when extreme weather conditions are not expected to occur.

4.1.7 Weather

In general, field team members will be equipped for the normal range of weather conditions. The FC/HSO will be aware of current weather conditions, and of the potential for those conditions to pose a hazard to the field crew. Some conditions that might force work stoppage are electrical storms, high winds, or high waves resulting from winds.

4.1.8 Small-boat Operations

Boat operations are associated with various risks, such as: 1) passengers or crew members falling overboard/drowning, 2) coming in contact with other vessels or being contacted by other vessels operating in the area, 3) losing power or steering capability and drifting into hazardous areas (i.e., shores, bridges, industrial facilities, etc.), and 4) encountering severe weather and dangerous water conditions. The risk of a boating accident can be reduced by ensuring that the boat operators are experienced, operating the vessel in compliance with USCG rules and regulations, maintaining the vessel in good mechanical order, avoiding bad weather and dangerous water conditions, and ensuring that required emergency equipment is available onboard.

Safety precautions that will be implemented as part of boat operations for this project include the following:

- ◆ The vessels must have required USCG safety equipment onboard in good conditions, including a life jacket for each project team member, a first aid kit, fire

extinguishers, distress flares, a throw-able life ring, navigation charts for the work area, running lights and a horn.

- ◆ Smoking is not permitted onboard the vessels.
- ◆ All crew members must be trained so that they know the location and use of onboard safety equipment.
- ◆ For vessels less than 25 feet long, at least one fire extinguisher must be onboard. For vessels greater than 26 feet in length but less than 40 feet, at least two fire extinguishers must be onboard.
- ◆ A life jacket must be worn by project team members at all times while working on boats, piers, docks that are not equipped with guardrails, and vessels when not tied to shore.
- ◆ The VHF radio must be turned on and monitored.
- ◆ Crew members should not untie mooring lines until instructed to do so by the vessel operator.
- ◆ Crew members should never jump between the vessel and the dock or other vessels.
- ◆ Docks, piers and shoreline areas should be approached slowly. The boat should never be fended off by placing your body between the boat and any object.
- ◆ All crew members should watch for hazards such as approaching vessels or wakes. It should never be assumed that other crew members see such hazards; therefore, they should be alerted to any potential risks that are observed.
- ◆ Crew members should be aware of overhead power lines and underwater utility corridors.
- ◆ If lightening or thunder occurs before the crew is able to get safely off the water, the 30/30 rule should be used: if the time between seeing the lightening and hearing thunder is 3 seconds or less, the boat should be moved near a tall structure such as a bridge and remain there until 30 minutes after the last thunder is heard.
- ◆ If refueling is necessary, the engine should be turned off and allowed to cool before fueling is attempted.

4.1.9 Vessel traffic

Because of the high volume of vessel traffic on the LDW, precautions and safe boating practices will be implemented to ensure that the field boat does not interrupt such traffic. As practical, the field boat will stay out of the navigation channel. Vessel traffic will be monitored on VHF channel 16.

4.1.10. Diving

It is anticipated that commercial divers may be needed for select sampling and/or inspection activities conducted for this project, and that the diving work will be conducted by a specialty contractor that will provide its own site-specific diving HSP (which will be reviewed by King County prior to review by the US Environmental Protection Agency [EPA]). The diving contractor must also comply with all applicable requirements of Washington Department of Labor & Industry Standards for Commercial Diving Operations (WAC 296-37) and provide a safe practices manual for each diving mode per WAC 296-37-530 before beginning dive operations. This manual must include the following:

- ◆ Safety procedures and checklists for diving operations
- ◆ Assignments and responsibilities of the dive team members
- ◆ Equipment procedures and checklists
- ◆ Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury

In addition, the contractor must produce a site-specific dive plan for each diving operation that specifies the means and methods that will be used to comply with all required elements of Washington State's diving standards. The dive plan document is also subject to review by King County and EPA.

4.2 CHEMICAL HAZARDS

Previous investigations have shown that some chemicals are present at higher-than-background concentrations in the sampling area. For the purposes of discussing the potential exposure of individuals to chemicals in sediments, the chemicals of concern are metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), dioxins/furans, and hydrogen sulfides.

4.2.1 Exposure routes

Potential routes of chemical exposure include inhalation, dermal contact, and ingestion. Exposure will be minimized by using safe work practices (Section 6) and by wearing the appropriate PPE. Further discussion of PPE requirements is presented in Section 7.

4.2.1.1 Inhalation

Inhalation is not expected to be an important route of exposure.

4.2.1.2 Dermal exposure

Dermal exposure to hazardous substances associated with sediments, surface water, or equipment decontamination will be controlled by the use of PPE, and by adherence to detailed sampling and decontamination procedures.

4.2.1.3 Ingestion

Incidental ingestion of sediment or surface water is not considered a major route of exposure for this project. Accidental ingestion of surface water is possible. However, careful handling of equipment and containers while onboard the boat should prevent water from splashing or spilling during sample collection and handling activities.

4.2.2 Description of chemical hazards

4.2.2.1 Metals

Exposure to metals at this site may occur via ingestion or skin contact. As mentioned above, neither is a likely exposure route. Metal fumes or metal-contaminated dust will not be encountered during field and sample handling activities. Large amounts of sediment would need to be ingested for any detrimental effects to occur. Momentary skin contact allows little, if any, opportunity for metals to pass into the body. Field procedures require immediate washing of sediments from exposed skin.

4.2.2.2 Polycyclic aromatic hydrocarbons and semivolatile organic compounds

Exposure to PAHs or SVOCs at this site may occur via ingestion or skin contact. Inhalation, the most important human health exposure pathway for this group of chemicals, is not expected to occur at this site. Large amounts of sediment would need to be ingested for any detrimental effects to occur. Some PAHs may be carcinogenic after long periods of skin contact. However, momentary skin contact allows little, if any, opportunity for compounds to pass into the body. Field procedures require immediate washing of sediments from exposed skin.

4.2.2.3 Polychlorinated biphenyls

Exposure to PCBs at this site may occur via ingestion or skin contact. Acute and chronic exposure can damage the liver and cause symptoms of edema, jaundice, anorexia, nausea, abdominal pains, and fatigue. PCBs are a suspected human carcinogen, although large amounts of sediment would need to be ingested for any detrimental effects to occur. Prolonged skin contact with PCBs may cause acne-like symptoms known as chloracne. Irritation to eyes, nose, and throat may also occur. However, momentary skin contact allows little, if any, opportunity for compounds to pass into the body. Field procedures require immediate washing of sediments from exposed skin.

4.2.2.4 Dioxins/furans

Exposure to dioxins/furans at this site may occur via ingestion or skin contact. Acute and chronic exposure can damage the liver, increase the risk of diabetes and abnormal glucose tolerance, and possibly increase the risk for reproductive and developmental effects. 2,3,7,8-TCDD is a possible human carcinogen, and a mixture of dioxins/furans with six chlorine atoms (four of the six chlorine atoms at the 2-, 3-, 7-, and 8-positions) is a probable human carcinogen. However, large amounts of sediment would need to be ingested for any detrimental effects to occur. Prolonged skin contact with

dioxins/furans may cause acne-like symptoms known as chloracne. Other effects on the skin, such as red skin rashes, have been reported to occur in people following exposure to high concentrations of 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD). Momentary skin contact allows little, if any, opportunity for the passage of any of the compounds into the body. Field procedures require the immediate washing of sediments from exposed skin.

4.3 ACTIVITY HAZARD ANALYSIS

The activity hazard analysis summarizes the hazards associated with pre-design sampling activities and along with the controls that can reduce or eliminate the risk of these hazards occurring (Table A-2). Job safety analysis (JSA) sheets are also included in Attachment 2 for description of potential hazards that may be encountered during implementation of the environmental sediment sampling (including sediment sample collection and core processing), visual shoreline inspection, geotechnical sediment sampling, and structures inspections. JSAs associated with completion of focused topographic surveys and other surveys (as necessary) will be included in the surveying HSP.

Table C-2. Activity hazard analysis

Hazard	Control
Slips and trips	Use extra care when walking on uneven and unstable surfaces along the shoreline, and under wet/slippery conditions. Wear boots with good tread.
Falling overboard	Use care in boarding/departing from the vessel. Wear a PFD. Provide and make readily accessible on each boat a life ring to throw to the person in the water. Have one onboard person (a spotter) keep an eye on the victim and shout the distance (boat lengths) and direction (o'clock) of the victim from the vessel. Stop work and use the vessel to retrieve the person in the water. Approach the person from downstream.
Skin or eye contact with contaminated sediments or liquids	Wear modified Level D PPE. Immediately wash sediments from exposed skin. Use an eyewash, if necessary, for contaminated or foreign debris in the eyes.
Back strain	Use appropriate technique for lifting equipment and samples, or seek help.
Overhead hazards	Use caution and be aware of overhead and gear hazards such as the grab sampler and A-frame. Wear a hard hat and modified Level D PPE when working on deck.
Open hatches	Keep hatches closed when not being accessed. Be aware around hatch area and use caution when entering/exiting hatch.
Heat stress	Monitor crew members for signs/symptoms of heat stress. Remove person to cool area and remove extra layers of clothing. Promote evaporative cooling and rehydrate with electrolytic fluids.
Cold stress	Monitor crew members for signs/symptoms of hypothermia. Minimize prolonged exposure to wet and cold conditions. Remove person to warm area and remove wet clothing. Rehydrate with warm fluids.
Weather	Monitor weather forecast and local conditions. Stop work if conditions pose a hazard (e.g., electrical storms, high winds) and resume work when safe to do so.
Fatigue	Take regular breaks, and limit repeated excessively long work days.

Hazard	Control
Pinch points and cuts	Be aware of pinch points and potential for cuts during sample collection and processing. Handle equipment and tools with care, Use safety knives if necessary, and follow instruction manuals for any power tools.

Note: Responses to boat emergencies are addressed in Table A-4.

PFD – personal flotation device

PPE – personal protective equipment

5 Work Zones and Shipboard Access Control

During sampling and sample handling activities, work zones will be established to identify where sample collection and processing are actively occurring. The intent of the zones is to limit the migration of sample material out of its zone, and to restrict unauthorized access to active work areas by defining work zone boundaries. The work zones are described below.

5.1 SAMPLING ZONE

A sampling work zone will encompass the exclusion area where sample collection and handling activities are being performed. The FC/HSO will delineate the work zone as a particular area onboard the collection vessel or at each intertidal shoreline sampling location. Only persons with appropriate training, PPE, and authorization from the FC/HSO will be allowed to enter this zone while work is in progress.

5.2 DECONTAMINATION ZONE

A decontamination zone where personnel will clean soiled boots and/or PPE prior to leaving the work zone will be set up. The zone will have the buckets, brushes, soapy water, rinse water, or wipes necessary to clean boots, PPE, or other equipment leaving the work zone. Plastic bags will be provided for expendable and disposable materials. If the sampling location does not allow for the establishment of a decontamination zone, the FC/HSO will provide alternatives to prevent the spread of contamination.

Decontamination of the boat will be completed at the end of each work day. Cockpit and crew areas will be rinsed down with water to minimize the accumulation of sediment.

5.3 SUPPORT ZONE

The support zone is any work area beyond the sampling work zone and decontamination zone boundaries where sample collection and processing do not occur. Activities in this zone include boat operations (e.g., piloting the boat and remotely controlling sampling equipment), administrative work (e.g., observing the field effort, taking notes, filling out paperwork, communicating with project managers, and directing field staff), and rest breaks. Prior to entering the support zone, personnel are required to decontaminate or dispose of soiled PPE or equipment to limit the spread of contamination into the clean area.

5.4 ACCESS CONTROL

Security and control of access to the boat will be the responsibility of the FC/HSO and boat captain. Boat access will be granted to necessary project personnel and authorized visitors only. Any security or access control problems will be reported to the client or appropriate authorities.

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6 Communications and Safe Work Practices

Communications at the job site will occur by verbal direction, use of hand signals, radio, or a combination of all three. Site personnel will carry cellular telephones and a list of emergency telephone numbers included in this HSP. These telephone numbers are listed in Section 14.3 of this HSP and in the front matter of the document. Boat operators will have VHF radios that are capable of communicating with USCG emergency services and with other vessels operating in the immediate work area. An air horn will be staged at each work area to initiate an evacuation of the site in an emergency, should other means of communication (i.e., radio, telephone, etc.) fail. Site personnel will be informed of site emergency procedures and communication protocols during their initial site orientation.

Following common sense will minimize the risk of exposure or accidents at this work site. The following general safety rules will be adhered to on-site:

- ◆ Do not climb over or under obstacles of questionable stability (e.g., docks, piers).
- ◆ Do not eat, drink, smoke, or perform other hand-to-mouth transfers in the work zone.
- ◆ Work only in well-lighted spaces.
- ◆ Never enter a confined space without the proper training, permits, and equipment.
- ◆ Make eye contact with vessel/sampling equipment operators when moving within the range of their equipment.
- ◆ Be aware of the movements of shipboard equipment when not in the operator's range of vision.
- ◆ Get immediate first aid for all cuts, scratches, abrasions, or other minor injuries.
- ◆ Use the established sampling and decontamination procedures.
- ◆ Always use the buddy system.
- ◆ Be alert to your own and other workers' physical conditions.
- ◆ Report all accidents, no matter how minor, to the FC/HSO.
- ◆ Do not do anything dangerous or unwise even if ordered by a supervisor.

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7 Personal Protective Equipment and Safety Equipment

Appropriate PPE will be worn as protection against potential hazards. In addition, a PFD will be required when working onboard the boat. Prior to donning PPE, the field crew will inspect their PPE for any defects that might render the equipment ineffective.

Fieldwork will be conducted in Level D or modified Level D PPE, as discussed in Sections 7.1 and 7.2. Situations requiring PPE beyond modified Level D are not anticipated. Should the FC/HSO determine that PPE beyond modified Level D is necessary, the HSM will be notified and an alternative selected. This HSP also acknowledges that site conditions may change during implementation of the work, possibly leading to a change in exposure pathways or chemicals of concern. If changes are observed, evaluation for potential changes in PPE needs will be completed.

New personnel or visitors will be informed of PPE requirements during their initial site briefing (see Section 3).

7.1 LEVEL D PERSONAL PROTECTIVE EQUIPMENT

Workers performing general activities during which skin contact with contaminated materials is unlikely will wear Level D PPE. Level D PPE includes the following:

- ◆ Protective clothing
- ◆ Chemical-resistant steel-toed boots
- ◆ Chemical-resistant gloves
- ◆ Safety glasses

7.2 MODIFIED LEVEL D PERSONAL PROTECTIVE EQUIPMENT

Workers performing activities during which skin contact with contaminated materials is possible, and during which inhalation risks are not expected, will be required to wear an impermeable outer suit. The type of outerwear will be chosen according to the types of chemical contaminants that might be encountered. Modified Level D PPE includes the following:

- ◆ Impermeable outer garb such as rain gear
- ◆ Waterproof and chemical-resistant steel-toed boots
- ◆ Waders and wader boots
- ◆ Chemical-resistant outer gloves
- ◆ Heavy-duty waterproof gloves
- ◆ Hard hats

7.3 SAFETY EQUIPMENT

In addition to PPE that will be worn by shipboard personnel, basic emergency and first aid equipment will be provided. Equipment for the field team will include:

- ◆ A copy of this HSP
- ◆ A first aid kit adequate for the number of personnel
- ◆ Emergency eyewash
- ◆ Sunscreen
- ◆ Fire extinguisher

The FC/HSO will ensure that the safety equipment is onboard. Equipment will be checked daily to ensure its readiness for use.

8 Monitoring Procedures for Site Activities

A monitoring program that addresses the potential site hazards will be maintained. For this project, air, dust, and noise monitoring will not be necessary. The sampled media will be wet and will not pose a dust hazard, and none of the equipment will emit high-amplitude (> 85 dBA) sound. For this project, the monitoring program will consist of all workers monitoring themselves and their co-workers for signs that might indicate physical stress or illness.

All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental condition during the performance of all field activities. Examples of such changes are as follows:

- ◆ Headaches
- ◆ Dizziness
- ◆ Nausea
- ◆ Symptoms of heat stress
- ◆ Blurred vision
- ◆ Cramps
- ◆ Irritation of eyes, skin, or respiratory system
- ◆ Changes in complexion or skin color
- ◆ Changes in apparent motor coordination
- ◆ Increased frequency of minor mistakes
- ◆ Excessive salivation or changes in papillary response
- ◆ Changes in speech ability or speech pattern
- ◆ Shivering
- ◆ Blue lips or fingernails

If personnel develop any of these conditions, work will be halted immediately and the affected person(s) evaluated. If further assistance is needed, personnel at the local hospital will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the direct result of sample collection or handling activities, procedures will be modified to address the problem.

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9 Decontamination

Decontamination is necessary to prevent the migration of contaminants from the work zone(s) into the surrounding environment, and to minimize the risk of exposure of personnel to contaminated materials that might adhere to PPE. The following sections discuss personnel and equipment decontamination. The following supplies will be available to perform decontamination activities:

- ◆ Wash buckets
- ◆ Rinse buckets
- ◆ Scrub brushes
- ◆ Clean water sprayers
- ◆ Paper towels
- ◆ Plastic garbage bags
- ◆ Alconox® or similar decontamination solution

9.1 MINIMIZATION OF CONTAMINATION

The first step in addressing contamination is to prevent or minimize exposure to existing contaminated materials and the spread of those materials. During field activities, the FC/HSO will enforce the following measures:

Personnel:

- ◆ Do not walk through areas of obvious or known contamination, if avoidable.
- ◆ Do not handle, touch, or smell contaminated materials directly.
- ◆ Make sure PPE has no cuts or tears prior to use.
- ◆ Fasten all closures on outer clothing, covering with tape if necessary.
- ◆ Protect and cover any skin injuries.
- ◆ Stay upwind of airborne dusts and vapors.
- ◆ Do not eat, drink, chew tobacco, or smoke in the work zones.

Sampling equipment and boat:

- ◆ Place clean equipment on a plastic sheet or aluminum foil to avoid direct contact with contaminated media.
- ◆ Keep contaminated equipment and tools separate from clean equipment and tools.
- ◆ Clean boots before entering the boat.

9.2 PERSONNEL DECONTAMINATION

The FC/HSO will ensure that all site personnel are familiar with personnel decontamination procedures. Personnel will perform the following decontamination procedures, as appropriate, before eating lunch, taking a break, or leaving the work location:

1. If outer suit is heavily soiled, rinse it off.
2. Remove outer suit.
3. Wash and rinse outer gloves and boots with soapy water.
4. Remove outer gloves; inspect and discard if damaged.
5. Remove inner gloves and discard.
6. Wash hands.

Before returning to work, personnel will re-don all necessary PPE. If leaving for the day, personnel will dispose of soiled, expendable PPE.

9.3 SAMPLING EQUIPMENT DECONTAMINATION

Sampling equipment will be decontaminated, as described in Section 4.6 of the QAPP, to minimize sample contamination and worker exposure to contamination from samples. The following practices will be followed:

- ◆ All utensils or equipment used directly in handling sediment (e.g., such as the grab sampler, hand corers, shovels, spoons and bowls) will be scrubbed with Alconox® detergent, rinsed with deionized water, and stored wrapped in aluminum foil until use.
- ◆ Sample processing surfaces will be cleaned and lined with aluminum foil to prevent direct contact with samples.
- ◆ Ice chests will be scrubbed with Alconox® detergent and rinsed with deionized water prior to any sampling activities.
- ◆ Wet ice used for sample storage during field activities will be contained in separate plastic bags, and samples will be placed in resealable, waterproof plastic bags to avoid contamination from melting ice.
- ◆ Sampling equipment will be free from contaminants such as oils, grease, and fuels.

10 Disposal of Contaminated Materials

Contaminated materials that may be generated during field activities include PPE and excess sample material. These contaminated materials will be disposed of as an integral part of the project.

10.1 PERSONAL PROTECTIVE EQUIPMENT

All disposable sampling materials and PPE – such as disposable coveralls, gloves, and paper towels used in sample processing – will be placed in heavyweight garbage bags. Filled garbage bags will be placed in a normal refuse container for disposal as solid waste.

10.2 EXCESS SAMPLE MATERIALS

At each sampling location, excess or unwanted sediment collected will be returned to the collection site.

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11 Training Requirements

Individuals performing work at locations where potentially hazardous materials and conditions may be encountered must meet specific training requirements. It is not anticipated that hazardous concentrations of contaminants will be encountered in sampled material, so training will consist of site-specific instruction for all personnel and oversight of inexperienced personnel by an experienced person for one working day. The following sections describe the training requirements for this fieldwork.

11.1 PROJECT-SPECIFIC TRAINING

In addition to HAZWOPER training, as described in Section 3.6 of the QAPP, field personnel will undergo training specifically for this project. All personnel and visitors must read this HSP and be familiar with its contents before beginning work or providing oversight. They must acknowledge reading the HSP by signing the HSP review form (see front matter). The signed form will be kept in the project files.

The boat captain and FC/HSO will also be required to have the US Coast Guard (USCG) Auxiliary Boating Safety certification. The boat captain or a designee will provide project-specific training prior to the first day of fieldwork and whenever new workers arrive. Field personnel will not be allowed to begin work until project-specific training has been completed and documented by the FC/HSO. Training will address the HSP and all health and safety issues and procedures pertinent to field operations. Training will include, but not be limited to, the following topics:

- ◆ Activities with the potential for exposure to chemicals
- ◆ Activities that pose physical hazards, and actions to control the hazards
- ◆ Ship access control and procedures
- ◆ Use and limitations of PPE
- ◆ Decontamination procedures
- ◆ Emergency procedures
- ◆ Use and hazards of sampling equipment
- ◆ Location of emergency equipment on the vessel
- ◆ Vessel safety practices
- ◆ Vessel evacuation and emergency procedures

11.2 DAILY SAFETY BRIEFINGS

The FC/HSO or a designee and the boat captain will present safety briefings before the start of each day's activities. These safety briefings will outline the activities expected for the day, update work practices and hazards, address any specific concerns

associated with the work location, and review emergency procedures and routes. The FC/HSO or designee will document all safety briefings using the daily safety briefing form included in Attachment 2.

11.3 FIRST AID AND CPR

At least two members of the field team must have first aid and cardiopulmonary resuscitation (CPR) training. Documentation of which individuals possess first aid and CPR training will be kept in the project health and safety files.

12 Medical Surveillance

A medical surveillance program conforming to the provisions of 29 CFR 1910.120(f) is not necessary for field team members on this project, because they do not meet any of the following four criteria outlined in the regulations for implementation of a medical surveillance program:

- ◆ Employees who are or may be exposed to hazardous substances or health hazards at or above permissible exposure levels for 30 days or more per year (1910.120(f)(2)(I)).
- ◆ Employees who must wear a respirator for 30 days or more per year (1910.120(f)(2)(ii)).
- ◆ Employees who are injured or become ill as a result of possible overexposures involving hazardous substances or health hazards from an emergency response or hazardous waste operation (1910.120(f)(2)(iii)).
- ◆ Employees who are members of HAZMAT teams (1910.120(f)(2)(iv)).

As described in Section 8, employees will monitor themselves and each other for any deleterious changes in their physical or mental conditions during the performance of all field activities.

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13 Reporting and Record Keeping

Each member of the field crew will sign the HSP review form (see front matter). If necessary, accident/incident report forms and Occupational Safety and Health Administration (OSHA) Form 200s will be completed by the FC/HSO.

The FC/HSO or a designee will maintain a health and safety field logbook with daily records of health- and safety-related details for the project. The logbook will utilize daily safety briefing forms (Attachment 2) and must be bound and the pages must be numbered consecutively. Entries will be made with indelible ink. At a minimum, each day's entries must include the following information:

- ◆ Project name or location
- ◆ Names of all personnel onboard
- ◆ Weather conditions
- ◆ Type of fieldwork being performed

The person maintaining the entries will initial and date the bottom of each completed page. Blank space at the bottom of an incompletely filled page will be lined out. Each day's entries will begin on the first blank page after the previous workday's entries.

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14 Emergency Response Plan

As a result of the hazards onboard the sampling vessels and the conditions under which operations will be conducted, the potential exists for an emergency situation to occur. Emergencies may include personal injury, exposure to hazardous substances, fire, explosion, or release of toxic or non-toxic substances (spills). OSHA regulations require that an emergency response plan be available for use onboard to guide actions in emergency situations.

Onshore organizations will be relied upon to respond to emergency situations. Given the location of the site, the local fire department and ambulance service can provide timely response. Field personnel will be responsible for identifying an emergency situation, providing first aid if applicable, notifying the appropriate personnel or agency, and evacuating any hazardous area. Shipboard personnel will attempt to control only very minor hazards that could present an emergency situation, such as a small fire; otherwise, all personnel will rely on outside emergency response resources.

The following sections identify the onboard individual(s) who should be notified in case of emergency, provide a list of emergency telephone numbers, offer guidance for particular types of emergencies, and provide directions and a map for getting from any sampling location to a hospital.

14.1 PRE-EMERGENCY PREPARATION

Before the start of field activities, the FC/HSO will ensure that preparation has been made in anticipation of emergencies. Preparatory actions include the following:

- ◆ Meeting between the FC/HSO and equipment handlers concerning emergency procedures in the event that a person is injured
- ◆ A training session given by the FC/HSO informing all field personnel of emergency procedures, locations of emergency equipment and its uses, and proper evacuation procedures
- ◆ A training session given by senior staff on operating field equipment to apprise field personnel of operating procedures and specific risks associated with that equipment
- ◆ Ensuring that field personnel are aware of the existence of the emergency response plan in the HSP, and ensuring that a copy of the HSP accompanies the field team

14.2 PROJECT EMERGENCY COORDINATOR

The FC/HSO will serve as the project emergency coordinator in the event of an emergency. He will designate his replacement during those times when he is not onboard or is not serving as the project emergency coordinator; the designation will be

noted in the logbook. The project emergency coordinator will be notified immediately when an emergency is recognized. The project emergency coordinator will be responsible for evaluating the emergency situation, notifying the appropriate emergency response units, coordinating access with those units, and directing interim actions onboard before the arrival of emergency response units. The project emergency coordinator will notify the HSM and the PMs as soon as possible after initiating an emergency response action. The PMs will have responsibility for notifying the client.

14.3 EMERGENCY RESPONSE CONTACTS

All onboard personnel must know whom to notify in the event of an emergency situation, even though the FC/HSO has primary responsibility for notification. Table A-3 lists the names and phone numbers for emergency response services and individuals.

Table C-3. Emergency response contacts

Contact	Telephone Number
Emergency Numbers	
Ambulance	911
Police	911
Fire	911
Harborview Medical Center	206.323.3074
Emergency Responders	
US Coast Guard Emergency General information	206.286.5400 206.442.5295 VHF Channel 16
National Response Center	800.424.8802
US Environmental Protection Agency	800.424.8802
Washington State Department of Ecology – Northwest Region Spill Response (24-hour emergency line)	206.649.7000
Emergency Contacts	
<i>Anchor QEA Project Manager</i>	
Tom Wang	206.903.3314
<i>Windward Project Manager</i>	
Kathy Godtfredsen	206.812.5413
<i>Corporate Health and Safety Manager</i>	
David Templeton	206.910.4279
Gloria Palermo	315.622.3723
<i>Field Coordinator/ Field Health and Safety Officer</i>	
Thai Do (Windward)	206.812.5407
Matt Woltman (Anchor QEA)	206.903.3327

14.4 RECOGNITION OF EMERGENCY SITUATIONS

Emergency situations will generally be recognizable by observation. An injury or illness will be considered an emergency if it requires treatment by a medical professional and cannot be treated with simple first aid techniques.

14.5 DECONTAMINATION

In the case of evacuation, decontamination procedures will be performed only if doing so does not further jeopardize the welfare of site workers. If an injured individual is also heavily contaminated and must be transported by emergency vehicle, the emergency response team will be informed of the type of contamination. To the extent possible, contaminated PPE will be removed from the injured individual, but only if doing so does not exacerbate the injury. Plastic sheeting will be used to reduce the potential for spreading contamination to the inside of the emergency vehicle.

14.6 FIRE

Field personnel will attempt to control only small fires, should they occur. If an explosion appears likely, personnel will follow evacuation procedures specified during the training session. If a fire cannot be controlled with the onboard fire extinguisher that is part of the required safety equipment, personnel will either withdraw from the vicinity of the fire or evacuate the boat as specified in the training session.

14.7 PERSONAL INJURY

In the event of serious personal injury, including unconsciousness, possibility of broken bones, severe bleeding or blood loss, burns, shock, or trauma, the first responder will immediately do the following:

- ◆ Designate an individual to call 911 and administer first aid, if qualified.
- ◆ If not qualified, seek out an individual who is qualified to administer first aid, if time and conditions permit.
- ◆ Notify the project emergency coordinator of the incident, the name of the injured individual(s), the location of the individual, and the nature of the injury.

The FC/HSO or designee will immediately do the following:

- ◆ Notify the boat captain and the appropriate emergency response organization.
- ◆ Assist the injured individual(s).
- ◆ Follow the emergency procedures for retrieving or disposing of equipment reviewed in the training session, and leave the site en route to the predetermined land-based emergency pickup.
- ◆ Designate someone to accompany the injured individual to the hospital.

- ◆ If a life-threatening emergency occurs (i.e., injury where death is imminent without immediate treatment), the FC/HSO or boat captain will call 911 and arrange to meet the ambulance unit at the nearest accessible dock.
- ◆ If a non-life-threatening emergency occurs (i.e., broken bones, minor lacerations, etc.), the project emergency coordinator will follow the procedures outlined above and proceed to the Harbor Island Marina, or to an alternative location of his choice if that would be more expedient.
- ◆ Notify the HSM and the PM.

If the project emergency coordinator determines that an emergency response is not necessary, he may direct someone to decontaminate and transport the individual by vehicle to the nearest hospital. Directions showing the route to the hospital are in Section 14.11.

If a worker leaves the boat to seek medical attention, another worker should accompany him to the hospital. When in doubt about the severity of an injury or exposure, always seek medical attention as a conservative approach, and notify the project emergency coordinator.

The project emergency coordinator will be responsible for completing all accident/incident field reports, OSHA Form 200s, and other required follow-up forms.

14.8 OVERT PERSONAL EXPOSURE OR INJURY

If an overt exposure to toxic materials occurs, the first responder to the victim will initiate actions to address the situation. The following actions should be taken, depending on the type of exposure.

14.8.1 Skin contact

- ◆ Wash/rinse the affected area thoroughly with copious amounts of soap and water.
- ◆ If eye contact has occurred, rinse the eyes for at least 15 minutes using the eyewash that is part of the onboard emergency equipment.
- ◆ After initial response actions have been taken, seek appropriate medical attention.

14.8.2 Inhalation

- ◆ Move victim to fresh air.
- ◆ Seek appropriate medical attention.

14.8.3 Ingestion

- ◆ Seek appropriate medical attention.

14.8.4 Puncture wound or laceration

- ◆ Seek appropriate medical attention.

14.9 SPILLS AND SPILL CONTAINMENT

No bulk chemicals or other materials subject to spillage are expected to be used during this project. Accordingly, no spill containment procedure is required for this project. If crew members encounter a spill created by any others, they will immediately notify the contractor in charge of the spill areas so they can initiate a cleanup action.

14.10 BOATING EMERGENCY HAZARDS

Emergency responses to boating hazards are described in Table A-4. Boat operators will have VHF radios that are capable of communicating with US Coast Guard emergency services and with other boats operating in the immediate work area. USCG monitors channel 16.

Table C-4. Potential boat emergency hazards and responses

Potential Emergency Hazard	Response
Fire or explosion	If manageable, attempt to put out a small fire with a fire extinguisher. Otherwise, call the USCG or 911, evacuate the area (by life rafts, rescue boat, or swimming), and meet at a designated location. The HSO will take roll call to make sure everyone has evacuated safely. Emergency meeting locations will be determined in the field during the daily safety briefings.
Medical emergency/ personal injury	At least two people with current first aid and CPR training will be onboard the vessel at all times. This person will attempt to assess the nature and critical path of the injury, call 911 immediately, and apply first aid/CPR if necessary. Stop work and wait for medical personnel to arrive. Fill out a site accident report.
Falling into an open hatch	Stop work and rescue the person, if safe and necessary. Assess the nature of the injury, and follow the response for medical emergency/personal injury.
Person overboard	Immediately throw a life ring to the person in the water. Have one onboard person(a spotter) keep an eye on the victim and shout the distance (boat lengths) and direction (o'clock) of the victim from the vessel. Stop work and use the vessel to retrieve the person in the water. Approach the person from downstream.
Sinking vessel	Call the USCG immediately. If possible, wait for a rescue boat to arrive to evacuate vessel personnel. See fire/explosion section (above) for emergency evacuation procedures. The HSO will take roll call to make sure everyone has evacuated safely.
Hydraulic oil spill or leak	If the leak/spill is small, immediately apply absorbent pads to control the leak and continue work. If the leak/spill is uncontainable, stop work, call 911 immediately, and wait for assistance. The vessel operator will assess the personal safety hazard associated with the leak/spill and begin evacuation procedures if necessary.
Lack of visibility	If navigation visibility or personal safety is compromised because of smoke, fog, or other unanticipated hazards, stop work immediately. The vessel operator and HSO will assess the hazard and, if necessary, send out periodic horn blasts to notify other vessels potentially in the area of the sampling vessel's location. Move to a secure location (i.e., berth) and wait for visibility to clear.
Loss of power	Stop work and call the USCG for assistance. Vessel personnel should watch for potential collision hazards and notify vessel operator if hazards exist. Secure vessel to a berth, dock, or mooring as soon as possible.
Collision	Stop work and call the USCG for assistance. HSO and vessel operator will assess damage and potential hazards. If necessary, vessel will be evacuated and secured until repairs can be made.

CPR – cardiopulmonary resuscitation

HSO – health and safety officer

USCG – US Coast Guard

14.11 EMERGENCY ROUTES TO THE HOSPITAL

The name, address, and telephone number of the hospital that will be used to provide medical care is as follows:

Harborview Medical Center
325 - 9th Avenue
Seattle, WA
206.323.3074

Directions from the vicinity of the LDW to Harborview Medical Center are as follows (Figure A-ii):

From the Duwamish River boat ramp (at South River Street, beneath the 1st Avenue South bridge):

- ◆ Drive east on South River Street.
- ◆ Turn left on Occidental Avenue South.
- ◆ Turn left on East Marginal Way South.
- ◆ Turn right on South Michigan Street.
- ◆ Look for entrance ramps to I-5 Northbound.
- ◆ Drive north on I-5.
- ◆ Take the James Street exit.
- ◆ Drive east on James Street to 9th Avenue.
- ◆ Turn right on 9th Avenue.
- ◆ Emergency entrance will be two blocks south on the right.

From the Harbor Island Marina (1001 Southwest Klickitat Way):

- ◆ From marina parking lot, turn sharp right onto Klickitat Way Southwest.
- ◆ Turn slight right onto Southwest Spokane Street
- ◆ Turn slight left to take the ramp toward WA-99 N/I-5/Columbian Way.
- ◆ Keep left at the fork in the ramp.
- ◆ Stay straight to go onto West Seattle Bridge.
- ◆ Merge onto I-5 North via the ramp on the left.
- ◆ Take the James Street exit.
- ◆ Head east on James Street to 9th Avenue.
- ◆ Turn right on 9th Avenue.
- ◆ Emergency entrance will be two blocks south on the right.

From South Park Marina (8604 Dallas Ave South):

- ◆ From marina parking lot, turn right onto Dallas Avenue South.
- ◆ Turn right onto 16th Avenue South.
- ◆ Turn left on East Marginal Way South.
- ◆ Look for entrance ramps to I-5 Northbound.
- ◆ Drive north on I-5.
- ◆ Take the James Street exit.
- ◆ Drive east on James Street to 9th Avenue.
- ◆ Turn right on 9th Avenue.
- ◆ Emergency entrance will be two blocks south on the right.

15 References

- Amec, DOF, Ramboll, Floyd | Snider, GeoSyntec, Stephen Frost. 2015. Site-specific health and safety plan. Enhanced natural recovery/activated carbon pilot study. Lower Duwamish Waterway. Final. Amec Foster Wheeler Environment & Infrastructure, Inc., Dalton, Olmsted & Fuglevand, Inc., Ramboll-Environ, Floyd | Snider, Geosyntec Consultants, and Stephen Frost & Associates.
- CDC. 2018. Heat stress [online]. Centers for Disease Control and Prevention. Updated June 6, 2018. Available from:
https://www.cdc.gov/niosh/topics/heatstress/#_Heat_Stroke.

ATTACHMENT 1. MODIFICATION TO HEALTH AND SAFETY PLAN FORM

Modification to Health and Safety Plan



Date: _____

Project No: 180067-02.01

Project Name: Lower Duwamish Waterway Remedial Design

Modification: _____

Reason for Modification: _____

Site Personnel Briefed

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Name: _____ **Date:** _____

Approvals

Field Lead: _____
Printed Name Signature Date

Project Manager: _____
Printed Name Signature Date

ATTACHMENT 2. DAILY SAFETY BRIEFING FORM AND JOB SAFETY ANALYSIS SHEETS

Daily Safety Briefing Form

Date: _____
Project No: 180067-02.01
Project Name: Lower Duwamish Waterway Remedial Design

Person Conducting Meeting: _____ **Health & Safety Officer:** David Templeton **Project Manager:** Tom Wang

TOPICS COVERED:

- | | | |
|---|--|---|
| <input type="checkbox"/> Emergency Procedures and Evacuation Route | <input type="checkbox"/> Lines of Authority | <input type="checkbox"/> Lifting Techniques |
| <input type="checkbox"/> Directions to Hospital | <input type="checkbox"/> Communication | <input type="checkbox"/> Slips, Trips, and Falls |
| <input type="checkbox"/> HASP Review and Location | <input type="checkbox"/> Site Security | <input type="checkbox"/> Hazard Exposure Routes |
| <input type="checkbox"/> Safety Equipment Location | <input type="checkbox"/> Vessel Safety Protocols | <input type="checkbox"/> Heat and Cold Stress |
| <input type="checkbox"/> Proper Safety Equipment Use | <input type="checkbox"/> Work Zones | <input type="checkbox"/> Overhead and Underfoot Hazards |
| <input type="checkbox"/> Employee Right-to-Know/ SDS Location | <input type="checkbox"/> Vehicle Safety and Driving/ Road Conditions | <input type="checkbox"/> Chemical Hazards |
| <input type="checkbox"/> Fire Extinguisher Location | <input type="checkbox"/> Equipment Safety and Operation | <input type="checkbox"/> Flammable Hazards |
| <input type="checkbox"/> Eye Wash Station Location | <input type="checkbox"/> Proper Use of PPE | <input type="checkbox"/> Biological Hazards |
| <input type="checkbox"/> Buddy System | <input type="checkbox"/> Decontamination Procedures | <input type="checkbox"/> Eating/Drinking/Smoking |
| <input type="checkbox"/> Self and Coworker Monitoring | <input type="checkbox"/> Near Miss Reporting Procedures | <input type="checkbox"/> Reviewed Prior Lessons Learned |
| <input type="checkbox"/> Field Team Medical Conditions for Emergency Purposes (Confidential): _____ | | |

☐ Other: _____

<p>Weather Conditions: _____</p> <p>_____</p> <p>Daily Work Scope: _____</p> <p>_____</p> <p>Site-specific Hazards: _____</p> <p>_____</p> <p>Safety Comments: _____</p> <p>_____</p>	<p style="text-align: center;">Attendees</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Printed Name</th> <th style="width: 50%;">Signature</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p style="text-align: center;">End of Day Wellness Check</p> <table border="1" style="width: 100%;"> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	Printed Name	Signature																																
Printed Name	Signature																																		

Job Safety Analysis



Field Activities

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 001	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 28, 2019
Work Operation: Field activities	Superintendent/Competent Person: Fill in	Revised by: Fill in	Revised Date: Fill in
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information) 		Reviewed by: Fill in	Reviewed Date: Fill in
		Approved by: Fill in	Approved Date: Fill in

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> Follow the Job Safety Analysis (JSA) for boating activities. 	
Outdoor, physical activity	Slips, trips, and falls	<ul style="list-style-type: none"> Avoid walking while writing or texting—maintain a heads-up posture. Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. Maintain good housekeeping practices. Clean up all spills immediately. Be aware of weather effects on the work area, including wet and/or frozen ground. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to prevent any trips and falls. Be aware of and limit loose clothing or untied shoelaces that may contribute to slips, trip, and falls. Notify the field team members of any unsafe conditions. 	<ul style="list-style-type: none"> Routinely inspect work area for unsafe conditions.

Job Safety Analysis



Field Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, physical activity (continued)	Heat stress	<ul style="list-style-type: none"> Adjust work schedules, as necessary, to avoid the hottest part of the day. Take rest breaks as warranted. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat-related illness. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Monitor workers' physical conditions. Monitor outside temperature versus worker activity.
	Cold stress	<ul style="list-style-type: none"> Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. Consider additional precautions if working near water in cold weather. Have a dry change of clothing available. Train workers to recognize the symptoms of cold-related illness. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Monitor workers' physical conditions and PPE. Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	<ul style="list-style-type: none"> Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. If extremely cold conditions are forecast, consider additional precautions or postponing work activity. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Inspect PPE daily prior to use. Routinely inspect work area for deteriorating conditions.
	Sunshine	<ul style="list-style-type: none"> Have sunscreen available for ultraviolet protection. Have abundant water available to prevent dehydration. Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing. 	<ul style="list-style-type: none"> Ensure that sunscreen and water are available.
	Lightning	<ul style="list-style-type: none"> Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment. Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm. 	<ul style="list-style-type: none"> Obtain weather forecast and updates as needed.

Job Safety Analysis



Field Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, physical activity (continued)	High winds	<ul style="list-style-type: none"> Wear goggles or safety glasses if dust or debris are visible. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Ensure that goggles or safety glasses are available.
	Biological hazards (flora [e.g., poison ivy and poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes])	<ul style="list-style-type: none"> Be aware of likely biological hazards in the work area. Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. Wear hand and arm protection when clearing plants or debris from the work area. Be aware of potential wildlife and defensive behavior (e.g., nesting birds, or animals with young). 	<ul style="list-style-type: none"> Ensure that insect repellent is available. Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.
	Noise exposure	<ul style="list-style-type: none"> Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day). 	<ul style="list-style-type: none"> Ensure that hearing protection is available.

Commented [LR1]: Note to user: Please ensure that the list of biological hazards is consistent with site conditions as well as the text of the HASP.

Delete this note upon JSA finalization.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis



Sediment Sampling

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 002	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 28, 2019
Work Operation: Sediment sampling	Superintendent/Competent Person: Fill in	Revised by: Fill in	Revised Date: Fill in
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 Safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information) 		Reviewed by: Fill in	Reviewed Date: Fill in
		Approved by: Fill in	Approved Date: Fill in

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> Follow the Job Safety Analysis (JSA) for boating activities. 	
If using glassware		<ul style="list-style-type: none"> Follow the JSA for handling glassware. 	
Sediment sample retrieval and processing	Injury from hand and power tool operation (e.g., spatula or drill)	<ul style="list-style-type: none"> Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades). Be aware of electrical connections and water hazards when working with electric- or battery-operated tools. Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off. Keep guards on power tools when not in use. Corrective actions may involve installing guards over exposed, rotating parts; isolating or de-energizing equipment; establishing exclusion zones around high-hazard areas; and constructing guardrails around mechanical equipment to prevent inadvertent contact. 	<ul style="list-style-type: none"> Inspect tools to ensure that they are in good working order. Inspect electrical connections (if applicable). Inspect tools periodically to ensure dry and clean operation. Identify potential pinch, grab, crush, and struck-by hazards.
	Noise exposure	<ul style="list-style-type: none"> Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day). 	<ul style="list-style-type: none"> Ensure that hearing protection is available.

Job Safety Analysis



Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment sample retrieval and processing (continued)	Slips, trips, and falls	<ul style="list-style-type: none"> • Avoid walking while writing or texting—maintain a heads-up posture. • Be aware of potentially slippery surfaces, including boat decks, riprap, muddy or algae-covered rocks, shoreline plants/seaweed, thick mud, and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. • Maintain good housekeeping practices. Clean up all spills immediately. • Be aware of weather effects on the work area, including wet and/or frozen ground. • Jumping, running, and horseplay are prohibited. • Be cautious when entering or exiting the vessel, and load/unload items onto/off of the pier or shore once boarded. • Keep all areas clean and free of debris to prevent any trips and falls. • Notify the field team members of any unsafe conditions. 	<ul style="list-style-type: none"> • Routinely inspect work area for unsafe conditions.
	Ingestion of contaminants, or skin or eye contact with contaminants	<ul style="list-style-type: none"> • Wear appropriate PPE to prevent/reduce exposure. • Contact 911, as necessary; perform CPR if breathing stops. • Move exposed person away from source of contamination, and rinse mouth. If exposure to skin occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. • Follow decontamination procedures as outlined in the Health and Safety Plan (HASP). 	<ul style="list-style-type: none"> • Ensure that decontamination procedures are on hand and are reviewed. • Ensure that PPE and rinsing water are available.
	Muscle strain or injuries from improper lifting	<ul style="list-style-type: none"> • Use proper lifting techniques or ask for assistance with heavy objects. • If boating, avoid carrying objects directly onto or off the boat; rather, load/unload objects while on the boat to/from the pier/shore. 	<ul style="list-style-type: none"> • Evaluate weight and center of gravity of heavier items prior to lifting or moving.
	Pinch points	<ul style="list-style-type: none"> • If boating, secure any unsecured objects on deck; they may shift on deck quickly in wave, current, or engine acceleration conditions. • Maintain a safe distance from closing mechanisms and moving parts on sampling gear. • Avoid placing hands or self between boat and dock/piles. 	

Job Safety Analysis



Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Sediment sample retrieval and processing (continued)	Wading	<ul style="list-style-type: none"> • Be aware of potentially slippery surfaces and tripping hazards such as fallen brush, logs, rocks, and other debris. Wear footwear that has sufficient traction. • Be aware of water depth and potential drop-offs. • Be aware of existing and projected river flows. • Wear knee or chest waders as appropriate for traction and to protect against cold water. • Keep extra dry clothes on hand, including socks. • Consider carrying a walking staff for balance. • Always wear a PFD, even if water looks shallow or slow; drop-offs occur and water is often moving faster than it looks. 	<ul style="list-style-type: none"> • Inspect work area for tripping hazards visible from streambank. • Inspect waders for leaks. • Check depths and flows before wading. • Ensure that change of dry clothes is available if wading in cold weather or cold water conditions. • Inspect PFDs for integrity, particularly the cartridge charge on inflatable PFDs.
	Diving	<ul style="list-style-type: none"> • Follow safety checklists for diving operations. • Assign responsibilities for all dive team members. • Comply with all applicable requirements of Washington Department of Labor & Industry Standards for Commercial Diving Operations (WAC 296-37). • Provide a safe practices manual for each diving mode per WAC 296-37-530 before beginning dive operations. 	<ul style="list-style-type: none"> • Contractor will produce a site-specific dive plan for each diving operation that specifies the means and methods that will be used to comply with all required elements of Washington State's diving standards.
Working outdoors	Heat stress	<ul style="list-style-type: none"> • Adjust work schedules, as necessary, to avoid the hottest part of the day. • Take rest breaks as warranted. • Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. • Maintain body fluids at normal levels. • Train workers to recognize the symptoms of heat-related illness. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Monitor workers' physical conditions. • Monitor outside temperature versus worker activity.

Job Safety Analysis



Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Cold stress	<ul style="list-style-type: none"> • Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Consider additional precautions if working near water in cold weather. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	<ul style="list-style-type: none"> • Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
Working outdoors (continued)	Sunshine	<ul style="list-style-type: none"> • Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing. 	<ul style="list-style-type: none"> • Ensure that sunscreen and water are available.
	Lightning	<ul style="list-style-type: none"> • Do not begin or continue work until lightning subsides for 30 minutes. Disconnect and do not use or touch electronic equipment. • Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm. 	<ul style="list-style-type: none"> • Obtain weather forecast and updates as needed.
	High winds	<ul style="list-style-type: none"> • Wear goggles or safety glasses if dust or debris are visible. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available.

Job Safety Analysis



Sediment Sampling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Biological hazards (flora [e.g., poison ivy and poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes])	<ul style="list-style-type: none">• Be aware of likely biological hazards in the work area.• Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent.• Wear hand and arm protection when clearing plants or debris from the work area.	<ul style="list-style-type: none">• Ensure that insect repellent is available.• Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.

Commented [LR1]: Note to user: Please ensure that the list of biological hazards is consistent with site conditions as well as the text of the HASP.

Delete this note upon JSA finalization.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis



General Boating Activities

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 003	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 28, 2019
Work Operation: General boating activities	Superintendent/Competent Person: Fill in	Revised by: Fill in	Revised Date: Fill in
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> U.S. Coast Guard (USCG)-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information) 		Reviewed by: Fill in	Reviewed Date: Fill in
		Approved by: Fill in	Approved Date: Fill in

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Walking on deck	Pinch points	<ul style="list-style-type: none"> Secure any unsecured objects on deck; they may shift quickly in wave, current, or engine acceleration conditions. Maintain a safe distance from closing mechanisms and moving parts, such as on sampling gear. Avoid placing your hands or yourself between the boat and the dock or piles. 	<ul style="list-style-type: none"> Docks, piers and shoreline areas should be approached slowly
	Slips, trips, and falls	<ul style="list-style-type: none"> Avoid walking while writing or texting—maintain a heads-up posture. Be aware of potentially slippery surfaces, including boat decks, riprap, muddy or algae-covered rocks, shoreline plants or seaweed, thick mud, and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. Maintain good housekeeping practices. Clean up all spills immediately. Be aware of weather effects on the work area, including wet and/or frozen ground. Jumping, running, and horseplay are prohibited. Be cautious when entering or exiting the vessel, and load/unload items onto/off of the pier or shore once boarded. Keep all areas clean and free of debris to prevent any trips and falls. Notify the field team members of any unsafe conditions. Keep rope lines neatly coiled and stowed. Avoid stepping on or over lines. 	<ul style="list-style-type: none"> Routinely inspect work area for unsafe conditions. All crew members should watch for hazards such as approaching vessels or wakes. It should never be assumed that other crew members see such hazards.

Job Safety Analysis



General Boating Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
	Exceeding boat capacity	<ul style="list-style-type: none"> Keep the number of passengers and equipment as posted on boat placards within limits at all times. If conditions warrant, reduce capacity to maintain boat stability. 	<ul style="list-style-type: none"> Ensure that field team is aware of limits and adheres accordingly.
Walking on deck (continued)	Noise exposure	<ul style="list-style-type: none"> Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day). 	<ul style="list-style-type: none"> Ensure that hearing protection is available.
Working outdoors	Heat stress	<ul style="list-style-type: none"> Adjust work schedules, as necessary, to avoid the hottest part of the day. Take rest breaks as warranted. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat-related illness. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Monitor workers' physical conditions. Monitor outside temperature versus worker activity.
	Cold stress	<ul style="list-style-type: none"> Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. If the combined air and water temperature is below 90 degrees Fahrenheit (°F), wear a USCG-approved float coat, Mustang-type bib coveralls, or one-piece survival suit. Have a dry change of clothing available. Train workers to recognize the symptoms of cold-related illness. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Monitor workers' physical conditions and PPE. Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	<ul style="list-style-type: none"> Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. If extremely cold conditions are forecast, consider additional precautions or postponing work activity. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Inspect PPE daily prior to use. Routinely inspect work area for deteriorating conditions.
	Sunshine	<ul style="list-style-type: none"> Have sunscreen available for ultraviolet protection. Have abundant water available to prevent dehydration. Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing. 	<ul style="list-style-type: none"> Ensure that sunscreen and water are onboard.
	Fog	<ul style="list-style-type: none"> Wait for fog to lift for adequate visibility. 	<ul style="list-style-type: none"> Review weather forecast prior to field work.

Job Safety Analysis



General Boating Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Lightning	<ul style="list-style-type: none"> Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment. Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm. If the time between seeing the lightening and hearing thunder is 3 seconds or less, the boat should be moved near a tall structure such as a bridge and remain there until 30 minutes after the last thunder is heard. 	<ul style="list-style-type: none"> Obtain weather forecast and updates as needed.
	High river flows or high waves	<ul style="list-style-type: none"> Be aware of waves and forecasts and recent rainfall in your watershed. 	<ul style="list-style-type: none"> Have forecast available.
	High winds	<ul style="list-style-type: none"> Wear goggles or safety glasses if dust or debris are visible. Stow or secure loads or equipment that could be moved by wind, particularly when underway. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Ensure that goggles or safety glasses are onboard.
	Biological hazards (e.g., mosquitoes, deer flies, and horse flies)	<ul style="list-style-type: none"> Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. 	<ul style="list-style-type: none"> Ensure that insect repellent is onboard.
Vessel emergencies	Person overboard	<p>If you witness someone fall overboard:</p> <ul style="list-style-type: none"> Yell, "Person overboard!" Throw a flotation device immediately. If the engine is running, take it out of gear and swing the stern clear to keep from hitting the person. Call 911 or USCG as appropriate. Assign a spotter to keep the person in sight at all times. Contact nearby vessels for assistance. Recover the person from the water. <p>If you fall overboard:</p> <ul style="list-style-type: none"> Hold your mouth and nose closed and protect your head. When you reach the surface, look for movement, listen for sounds, and call for help. Use the whistle attached to the PFD and activate the beacon light. It is only sensible to swim if there is reason to believe you have a chance of reaching your destination. Too much movement in cold water causes hypothermia. 	<ul style="list-style-type: none"> Ensure that flotation devices are available. Ensure that team wears PFDs. Inspect PFDs for integrity, particularly the cartridge charge on inflatable PFDs. All crew members must be trained so that they know the location and use of onboard safety equipment.

Commented [LR1]: Note to user: Please ensure that the list of biological hazards is consistent with site conditions as well as the text of the HASP.

Delete this note upon JSA finalization.

Job Safety Analysis



General Boating Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Vessel emergencies (continued)	Fire, abandon ship	<ul style="list-style-type: none"> • Be prepared to abandon ship in case of major fire (too large to control with a fire extinguisher), or other emergency. • Only the boat captain can order abandon ship. • Communicate intent to abandon ship to all personnel onboard. • Notify USCG and nearby vessels of intent to abandon ship. • Call 911. • Notify the Project Manager and Field Lead, if time permits. • Be aware of the propeller position before abandoning ship. • Identify a rally point for all personnel. • Know the dangers of hypothermia. • Use the buddy system to support injured personnel. 	<ul style="list-style-type: none"> • For vessels less than 25 feet long, at least one fire extinguisher must be onboard. For vessels greater than 26 feet in length but less than 40 feet, at least two fire extinguishers must be onboard. • Review abandon ship procedures with field team prior to work.
Navigation	Boat traffic	<ul style="list-style-type: none"> • Maintain a safe operating distance from shoreline and other vessels. 	<ul style="list-style-type: none"> • Be aware of on-water surroundings. • The VHF radio must be turned on and monitored.
Motor vehicle operation and trailering	Boat not secured properly	<ul style="list-style-type: none"> • Ensure that latches, straps, antennas, and onboard gear are secure. Ensure that motor is up and lights are plugged in for driving. • Follow Job Safety Analysis (JSA) for motor vehicle operation. • Crew members should not untie mooring lines until instructed to do so by the vessel operator. 	<ul style="list-style-type: none"> • Inspect around entire boat before driving.

Commented [LR2]: Delete this row if we are not trailering.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If professional captained vessel is not in use, boat operators must take appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

General Boating Activities



Job Safety Analysis



Decontamination Activities

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 004	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 28, 2019
Work Operation: Decontamination activities	Superintendent/Competent Person: Fill in	Revised by: Fill in	Revised Date: Fill in
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> High-visibility safety vest Hard hat where overhead hazards and/or heavy equipment are present U.S. Coast Guard-approved personal flotation device (PFD), if boating (see cold stress section for cold-weather PFD information) 		Reviewed by: Fill in	Reviewed Date: Fill in
		Approved by: Fill in	Approved Date: Fill in

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> Follow the Job Safety Analysis (JSA) for boating activities. 	
Decontamination area set up	Vehicle, heavy equipment traffic, or boat traffic in work area	<ul style="list-style-type: none"> Wear high-visibility safety vest and hard hat PPE. Be alert when working around heavy equipment and/or other boats, especially if wearing hearing protection. 	<ul style="list-style-type: none"> Ensure that safety vests are available for staff and visitors.
	Muscle strain or injuries from improper lifting	<ul style="list-style-type: none"> Use proper lifting techniques or ask for assistance with heavy objects. If boating, avoid carrying objects directly onto or off of the boat; rather, load/unload objects while on the boat to/from the pier/shore. 	<ul style="list-style-type: none"> Evaluate weight and center of gravity of heavier items prior to lifting or moving.
	Biological hazards (flora [e.g., poison ivy, and poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes])	<ul style="list-style-type: none"> Be aware of likely biological hazards in the work area. Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. Wear hand and arm protection when clearing plants or debris from the work area. 	<ul style="list-style-type: none"> Ensure that insect repellent is available. Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.

Job Safety Analysis



Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontamination activities	Injury from hand and power tool operation (e.g., spatula or drill)	<ul style="list-style-type: none"> Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades). Be aware of electrical connections and water hazards when working with electric- or battery-operated tools. Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off. Keep guards on power tools when not in use. 	<ul style="list-style-type: none"> Inspect tools to ensure that they are in good working order. Inspect electrical connections (if applicable). Inspect tools periodically to ensure dry and clean operation.
	Noise exposure	<ul style="list-style-type: none"> Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day). 	<ul style="list-style-type: none"> Ensure that hearing protection is available.
	Slips, trips, and falls	<ul style="list-style-type: none"> Avoid walking while writing or texting—maintain a heads-up posture. Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. Maintain good housekeeping practices. Clean up all spills immediately. Be aware of weather effects on the work area, including wet and/or frozen ground. Jumping, running, and horseplay are prohibited. Keep all areas clean and free of debris to prevent any trips and falls. Notify the field team members of any unsafe conditions. 	<ul style="list-style-type: none"> Routinely inspect work area for unsafe conditions.
	Ingestion of contaminants or decontamination fluids, or skin or eye contact with contaminants or decontamination fluids	<ul style="list-style-type: none"> Wear appropriate PPE to prevent/reduce exposure. Contact 911, as necessary; perform CPR if breathing stops. Move exposed person away from source of contamination, and rinse mouth. If exposure to skin occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. Follow decontamination procedures as outlined in the Health and Safety Plan (HASP). 	<ul style="list-style-type: none"> Ensure that decontamination procedures are on hand and are reviewed. Ensure that PPE and rinsing water are available.
Working outdoors	Heat stress	<ul style="list-style-type: none"> Adjust work schedules, as necessary, to avoid the hottest part of the day. Take rest breaks as warranted. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat-related illness. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Monitor workers' physical conditions. Monitor outside temperature versus worker activity.

Job Safety Analysis



Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Cold stress	<ul style="list-style-type: none"> • Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Consider additional precautions if working near water in cold weather. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	<ul style="list-style-type: none"> • Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	<ul style="list-style-type: none"> • Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing. 	<ul style="list-style-type: none"> • Ensure that sunscreen and water are available.
	Lightning	<ul style="list-style-type: none"> • Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment. 	<ul style="list-style-type: none"> • Obtain weather forecast and updates as needed.
	High winds	<ul style="list-style-type: none"> • Wear goggles or safety glasses if dust or debris are visible. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).

Job Safety Analysis



Decontamination Activities

- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis



Drilling

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 005	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 2019
Work Operation: Geotechnical Drilling	Superintendent/Competent Person: To Be Determined	Revised by:	Revised Date:
Required PPE: <ul style="list-style-type: none"> Modified Level D—Standard work uniform/coveralls, work boots conforming to ASTM F2412-05, traffic safety vest conforming to ANSI 107, safety glasses conforming to ANSI Z87.1 with permanently installed side shields, hard hat conforming to ANSI Z89, hearing protection Depending on activity, the following PPE may also be required (see Section 5 of HASP): N95 dust mask, PFD, cold water clothing, disposable chemical coveralls, inner and outer gloves 		Reviewed by:	Reviewed Date:
		Approved by:	Approved Date:

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> Follow the JSA for boating activities. 	
Soil sample retrieval and processing	Injury from hand and power tool operation (e.g., spatula or drill)	<ul style="list-style-type: none"> When possible, have drilling contractor retrieve sampling equipment. Wear appropriate PPE. Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades). Be aware of electrical connections and water hazards when working with electric- or battery-operated tools. Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off. Keep guards on power tools when not in use. 	<ul style="list-style-type: none"> Inspect tools to ensure that they are in good working order. Inspect electrical connections (if applicable). <p>Inspect tools periodically to ensure dry and clean operation.</p>
	Noise exposure	<ul style="list-style-type: none"> Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day). 	Ensure that hearing protection is available.

Job Safety Analysis



Drilling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Soil sample retrieval and processing (continued)	Slips, trips, and falls	<ul style="list-style-type: none"> • Avoid walking while writing or texting—maintain a heads-up posture. • Be aware of potentially slippery surfaces, including boat decks, riprap, muddy or algae-covered rocks, shoreline plants/seaweed, thick mud, and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. • Maintain good housekeeping practices. Clean up all spills immediately. • Be aware of weather effects on the work area, including wet and/or frozen ground. • Jumping, running, and horseplay are prohibited. • Be cautious when entering or exiting the vessel, and load/unload items onto/off of the pier or shore once boarded. • Keep all areas clean and free of debris to prevent any trips and falls. • Notify the field team members of any unsafe conditions. • Stay clear of drilling contractor work zones, if possible. 	
	Muscle strain/injuries from improper lifting	<ul style="list-style-type: none"> • Use proper lifting techniques or ask for assistance with heavy objects. • If boating, avoid carrying objects directly onto or off the boat; rather, load/unload objects while on the boat to/from the pier/shore. 	Evaluate weight and center of gravity of heavier items prior to lifting/moving.
	Pinch points	<ul style="list-style-type: none"> • If boating, secure any unsecured objects on deck; they may shift on deck quickly in wave, current, or engine acceleration conditions. • Maintain a safe distance from closing mechanisms and moving parts on sampling gear. • Avoid placing hands or self between boat and dock/piles. 	
	Overhead Hazards	<ul style="list-style-type: none"> • Keep adequate distance between yourself and heavy overhead hazards, such as drill tooling and samplers. • Stay clear of drill rig while drill rig is in operation. • Wear appropriate PPE. 	Evaluate cables and connectors for overhead objects.
Working outdoors	Heat stress	<ul style="list-style-type: none"> • Adjust work schedules, as necessary, to avoid the hottest part of the day. • Take rest breaks as warranted. • Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. • Maintain body fluids at normal levels. • Train workers to recognize the symptoms of heat-related illness. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Monitor workers' physical conditions. • Monitor outside temperature versus worker activity.

Job Safety Analysis



Drilling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Cold stress	<ul style="list-style-type: none"> • Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Consider additional precautions if working near water in cold weather. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	<ul style="list-style-type: none"> • Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	<ul style="list-style-type: none"> • Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing. 	<ul style="list-style-type: none"> • Ensure that sunscreen and water are available.
	Lightning	<ul style="list-style-type: none"> • Do not begin or continue work until lightning subsides for 30 minutes. Disconnect and do not use or touch electronic equipment. • 	<ul style="list-style-type: none"> • Obtain weather forecast and updates as needed.
	High winds	<ul style="list-style-type: none"> • Wear goggles or safety glasses if dust or debris are visible. • Be aware of flying debris such as tree branches and/or falling trees or tree limbs. 	<ul style="list-style-type: none"> • Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available. • Monitor that workers are not placing themselves in danger of flying or falling debris.

Job Safety Analysis



Drilling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Biological hazards (flora [e.g., poison ivy and poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes])	<ul style="list-style-type: none">• Be aware of likely biological hazards in the work area.• Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent.• Wear hand and arm protection when clearing plants or debris from the work area.	<ul style="list-style-type: none">• Ensure that insect repellent is available.• Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.
	Remote site location	<ul style="list-style-type: none">• Maintain regular contact with field partner(s).• Acquire lines of sight of field partner(s) as often as possible.• Check-in each day with the field operations manager(s).	<ul style="list-style-type: none">• Provide workers with satellite GPS units for navigation.• Provide workers with radio communication devices so that regular contact can be made.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis



Anchor QEA Motor Vehicle Operation

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 006	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: David Gillingham	Analysis Date: October 28, 2019
Work Operation: Anchor QEA motor vehicle operation	Superintendent/Competent Person: Vehicle Driver	Revised by: Sam Giannakos	Revised Date:
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> Wear seat belt at all times Make sure that clothing will not interfere with driving 		Reviewed by:	Reviewed Date:
		Approved by:	Approved Date:

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation	Unfamiliar with the vehicle	<ul style="list-style-type: none"> Allow yourself some time to get familiar with an Anchor QEA vehicle, a rental vehicle, or one not used often. Test the lights, windshield wipers, hazard lights, horn, parking brake, and other important functions. Review the dashboard controls, steering radius, and overhead and side clearances. Allow extra side, front, and back space around the vehicle while driving or parking an unfamiliar vehicle. Adjust mirrors and the seat while the vehicle is in park. Drive slowly in confined locations, as in a parking garage, parking lots, or industrial settings. Confirm adequate clearances by sight before turning or backing up in tight or unfamiliar locations. Use a second person to be a spotter outside the vehicle if needed in tight spaces. 	<ul style="list-style-type: none"> Inspect fluid levels and air pressure in tires, adjust mirrors and seat positions appropriately, monitor the fuel level, and fill up when the fuel level is low
	Speed and braking	<ul style="list-style-type: none"> Fasten and properly adjust the seat belt. Obey all posted and designated speed limits. Radar detectors are prohibited in all company-owned, leased, or rented vehicles. Reduce travel speed during hazardous conditions (e.g., rain, fog, or snow). Identify whether your vehicle has Anti-Lock Brakes (ABS). If it does, DO NOT pump the brakes to stop when the vehicle has begun to skid. Apply steady pressure to the brakes. If the vehicle does not have ABS, pump the brakes to stop during slippery conditions. 	<ul style="list-style-type: none"> Seatbelt Identify designated speed limits Determine if vehicle has ABS

Job Safety Analysis



Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Distance spacing	<ul style="list-style-type: none"> Continually check your rear and side view mirrors. Use the 3-second rule to keep a safe distance between vehicles. Increase the 3-second rule as necessary during hazardous travel conditions. Regularly scan the area you will be entering in the next 10 to 12 seconds. Always leave yourself an "out" during travel. When stopping, make sure that you leave enough distance between you and the car in front of you. You should be able to see the rear tires of the vehicle in front when stopped. Obey the speed limit and traffic regulations. When at a red light and it turns green, use the "delayed start" technique, by counting to three before you take your foot off the brake. DO NOT TAILGATE. Keep headlights (and running lights, if available) on for maximum visibility. 	<ul style="list-style-type: none"> Seatbelt
	Skids	<ul style="list-style-type: none"> If the vehicle has begun to skid out of control, turn the steering wheel in the direction of the skid and re-adjust the wheel, as necessary. Reduce speed during hazardous travel conditions. Use 4-wheel drive, if available, when driving vehicles off-road, on steep inclines, or in muddy conditions. Do not take vehicles off-road if they cannot be operated safely in such conditions. 	<ul style="list-style-type: none"> Seatbelt
	Blind spots	<ul style="list-style-type: none"> Become familiar with any blind spots associated with your vehicle. Adjust mirrors to give the maximum viewing area. Use your directional devices to signal all turns and when changing lanes; check rear and side view mirror and glance over your shoulder to check that the lane is clear. Avoid other driver's blind spots; slow down and let the other vehicle pass. If parked for an extended period and staying in the vehicle, be sure to inspect the area for changed conditions (e.g., a car that moved in behind you) before leaving. 	<ul style="list-style-type: none"> Seatbelt Mirrors
	Backing	<ul style="list-style-type: none"> Back into parking spaces upon arrival whenever possible. Perform a 360-degree walk around the vehicle before backing to identify any new conditions or obstructions. Use a spotter when backing whenever possible. Understand hand signals. Sound the horn prior to backing. Check the rear and side view mirrors prior to backing. Back slowly in areas of obstructed vision. Anticipate others who may be backing out into your pathway and adjust accordingly. 	<ul style="list-style-type: none"> Seatbelt Mirrors

Job Safety Analysis



Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Distractions (e.g., cell phones, reading maps or directions, eating)	<ul style="list-style-type: none"> Do not engage in distracted driving—focus on operating the vehicle, and on your surroundings (e.g., road conditions and other drivers). Obey state or local laws regarding cell phone use, at a minimum. Certain clients prohibit cell phone use regardless of the state you are operating in—know your client's policy. Use hands-free devices (not hand-held cellular phones) while driving. Pull over to the side of the road when making a call or checking directions. 	<ul style="list-style-type: none"> Seatbelt Hands-free devices connected and ready for use
	Accidents	<ul style="list-style-type: none"> In the event of an accident, use the following procedures: <ul style="list-style-type: none"> Stop, call for medical assistance, notify police, and complete an accident report and submit it to your supervisor. Notify the Project Manager (PM) and Field Lead (FL). Complete the appropriate incident investigation reports. Contact Sara Weiskotten, Operations Liaison, at (857) 445-4987. Contact Diana Reynolds, Insurance Liaison, at (302) 236-8403. 	<ul style="list-style-type: none"> Seatbelt
	Influenced by drugs or alcohol	<ul style="list-style-type: none"> NEVER DRIVE UNDER THE INFLUENCE OF DRUGS OR ALCOHOL. Keep in mind that the person in another vehicle may be under the influence of controlled substances, and be prepared for erratic or sudden driving changes on their part. 	<ul style="list-style-type: none"> Seatbelt
	Driver attitude	<ul style="list-style-type: none"> Do not operate any vehicle when abnormally tired, temporarily disabled (i.e., injured), or under the influence of drugs or alcohol. Keep an even temper when driving. Do not let the actions of others affect your attitude. Do not allow yourself to become frustrated, rushed, distracted, or drowsy. 	<ul style="list-style-type: none"> Seatbelt
	Fatigue	<ul style="list-style-type: none"> Stop and rest if fatigued. Exit the road and enter a safe area. Rest until fully refreshed. Be aware that certain medications (such as cold or allergy medicines) may make you drowsy when driving a vehicle. 	<ul style="list-style-type: none"> Seatbelt
	Vehicle loading	<ul style="list-style-type: none"> DO NOT OVERLOAD the vehicle. Secure all equipment and supplies within the body of the vehicle using proper tie-downs. Do not block side view mirrors with the load. Do not transport U.S. Department of Transportation (DOT)-manifested hazardous materials. Dispatch all equipment and personnel with proper forms and identification. 	<ul style="list-style-type: none"> Seatbelt

Job Safety Analysis



Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Equipment failure	<ul style="list-style-type: none">• Perform daily inspections of your vehicle.• Maintain vehicle safety equipment (e.g., mirrors, alarms, horns, wipers, lights, and brakes).• Maintain the vehicle (e.g., tire pressure and fluid levels).• Any vehicle with mechanical defects that may endanger the safety of the driver, passengers, or the public shall not be used.• Ensure that appropriate safety equipment is in the vehicle. Safety equipment should include a spare tire, jack, first-aid kit, fire extinguisher, and flashlight. Flares and/or reflective triangles should be available in larger trucks.• Ensure that the proper documentation is in the vehicle. Documentation should include an operations manual for the vehicle, insurance card, vehicle registration, and accident forms.	<ul style="list-style-type: none">• Inspect and maintain the vehicle

Training Requirements:

- All drivers are required to have a valid driver's license, and all vehicles must have appropriate state vehicle registration and inspection stickers. The use of hand-held wireless devices is prohibited while driving any vehicle for business use at any time, for personal use during business hours, and as defined by law.
- **If operating a vehicle or vehicle and trailer with a capacity greater than 10,000 pounds, U.S. Department of Transportation regulations may apply. Contact the PM prior to any travel in this configuration.**
- All assigned employees are required to read, familiarize themselves with the contents of this Job Safety Analysis, and sign the signature page before the operation of an Anchor QEA vehicle, and review it with their supervisor during their daily safety meeting.
- All assigned employees are required to enroll and complete the Smith System Virtual Driving training programs (*Distracted Driving* and *Small Vehicle Forward - Five Keys to Safe Driving*) prior to driving an Anchor QEA vehicle.

Job Safety Analysis



Anchor QEA Motor Vehicle Operation

Vehicle Operation Job Safety Analysis Acknowledgement Form

The Anchor QEA Motor Vehicle Operation Job Safety Analysis must be read, understood, and signed before the operation of any Anchor QEA vehicle. My signature below certifies that I have read and understand the procedures presented in the Anchor QEA Motor Vehicle Operation Job Safety Analysis and have completed the Smith System Virtual Driving *Distracted Driving* and *Small Vehicle Forward - Five Keys to Safe Driving* training programs.

Date	Name (print)	Signature

Job Safety Analysis



Anchor QEA Motor Vehicle Operation

Date	Name (print)	Signature

Job Safety Analysis



Investigation-derived Waste Management

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 010	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 28, 2019
Work Operation: Investigation-derived waste management	Superintendent/Competent Person: Fill in	Revised by: Fill in	Revised Date: Fill in
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD). 		Reviewed by: Fill in	Reviewed Date: Fill in
		Approved by: Fill in	Approved Date: Fill in

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Containerizing investigation-derived waste (IDW) at the source	Lifting	<ul style="list-style-type: none"> Use care when lifting to redistribute IDW from one container (e.g., drums and buckets) to another at the source. Seek assistance if loads are too heavy, or if you are experiencing fatigue. Fill containers only to the degree that will be manageable in the future (e.g., half full) and to limit weight. 	<ul style="list-style-type: none"> Inspect containers for competency (i.e., no cracks, and handles in good repair).
	Pinch points	<ul style="list-style-type: none"> Wear hand protection when closing containers. Use the buddy system when affixing drum rings. 	<ul style="list-style-type: none"> Inspect drums for rust or sharp edges prior to opening or closing.
Relocating or staging IDW containers	Lifting	<ul style="list-style-type: none"> Use task-specific tools whenever possible to move full containers (i.e., hoists, drum caddies or dollies, and vehicles). When task-specific tools are not available, use the buddy system to move containers that are reasonable to lift. Never roll drums or containers holding IDW. Stage containers in areas protected from heavy traffic and weather, if possible. 	<ul style="list-style-type: none"> Ensure tools are in good repair. Assess IDW container weight prior to moving.

Job Safety Analysis



Investigation-derived Waste Management

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Relocating or staging IDW containers (continued)	Pinch points or crushing	<ul style="list-style-type: none">• Use tools to achieve the final arrangement when staging containers—do not place hands on the edges of containers while moving them into place.• Stand well clear of containers being moved in case they become dislodged from their handling tool during transport.• Do not stack IDW containers, as this poses a risk for container toppling and damage.• Place containers on a wooden pallet for easy transfer using a pallet jack, if possible.	<ul style="list-style-type: none">• Inspect drums for evidence of cracks or rust.
IDW management – general	Splash	<ul style="list-style-type: none">• Wear the required PPE at all times.• Use care to minimize splashing or smearing of IDW during handling and containerization.	<ul style="list-style-type: none">• Inspect PPE upon donning and periodically during tasks.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis



Structure Inspection

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 008	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 28, 2019
Work Operation: Stream, wetland, and habitat surveys	Superintendent/Competent Person: Fill in	Revised by: Fill in	Revised Date: Fill in
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 Safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information) 		Reviewed by: Fill in	Reviewed Date: Fill in
		Approved by: Fill in	Approved Date: Fill in

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		<ul style="list-style-type: none"> Follow the Job Safety Analysis (JSA) for boating activities. 	
Walking and working in natural environments	Slips, trips, and falls	<ul style="list-style-type: none"> Avoid walking while writing or texting—maintain a heads-up posture. Be aware of potentially slippery surfaces, including boat decks, riprap, muddy or algae-covered rocks, shoreline plants or seaweed, thick mud, and tripping hazards such as vines and logs. Use handrails where available. Wear footwear that has sufficient traction. Maintain good housekeeping practices. Clean up all spills immediately. Be aware of weather effects on the work area, including wet and/or frozen ground. Jumping, running, and horseplay are prohibited. Be cautious when entering or exiting the vessel, and load/unload items onto/off of the pier or shore once boarded. Keep all areas clean and free of debris to prevent any trips and falls. Notify the field team members of any unsafe conditions. 	<ul style="list-style-type: none"> Routinely inspect work area for unsafe conditions.

Job Safety Analysis



Structure Inspection

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Walking and working in natural environments (continued)	Wading	<ul style="list-style-type: none"> • Be aware of potentially slippery surfaces and tripping hazards such as fallen brush, logs, rocks, and other debris. Wear footwear that has sufficient traction. • Be aware of the water depth and potential drop-offs. • Be aware of existing and projected river flows. • Wear knee or chest waders as appropriate for traction and to protect against cold water. • Keep extra dry clothes on hand, including socks. • Consider carrying a walking staff for balance. • Always wear a PFD, even if water looks shallow or slow; drop-offs occur and water is often moving faster than it looks. 	<ul style="list-style-type: none"> • Inspect work area for tripping hazards visible from streambank. • Inspect waders for leaks. • Check depths and flows before wading. • Ensure that change of dry clothes is available if wading in cold weather or cold water conditions. • Inspect PFDs for integrity, particularly the cartridge charge on inflatable PFDs.
	Diving	<ul style="list-style-type: none"> • Follow safety checklists for diving operations. • Assign responsibilities for all dive team members. • Comply with all applicable requirements of Washington Department of Labor & Industry Standards for Commercial Diving Operations (WAC 296-37). • Provide a safe practices manual for each diving mode per WAC 296-37-530 before beginning dive operations. 	<ul style="list-style-type: none"> • Contractor will produce a site-specific dive plan for each diving operation that specifies the means and methods that will be used to comply with all required elements of Washington State's diving standards.
	Biological hazards (flora [e.g., poison ivy and poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes])	<ul style="list-style-type: none"> • Be aware of likely biological hazards in the work area. • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. • Wear hand and arm protection when clearing plants or debris from the work area. • Be aware of potential wildlife and defensive behavior (e.g., nesting birds, or animals with young). 	<ul style="list-style-type: none"> • Ensure that insect repellent is available. • Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.
	Noise exposure	<ul style="list-style-type: none"> • Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day). 	<ul style="list-style-type: none"> • Ensure that hearing protection is available.

Job Safety Analysis



Structure Inspection

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors	Heat stress	<ul style="list-style-type: none"> Adjust work schedules, as necessary, to avoid the hottest part of the day. Take rest breaks as warranted. Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. Maintain body fluids at normal levels. Train workers to recognize the symptoms of heat-related illness. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Monitor workers' physical conditions. Monitor outside temperature versus worker activity.
Working outdoors (continued)	Cold stress	<ul style="list-style-type: none"> Provide shelter (enclosed, heated environment) to protect personnel during rest periods. Educate workers to recognize the symptoms of frostbite and hypothermia. Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. Consider additional precautions if working near water in cold weather. Have a dry change of clothing available. Train workers to recognize the symptoms of cold-related illness. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Monitor workers' physical conditions and PPE. Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	<ul style="list-style-type: none"> Wear appropriate PPE (rain gear). Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. If extremely cold conditions are forecast, consider additional precautions or postponing work activity. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Inspect PPE daily prior to use. Routinely inspect work area for deteriorating conditions.
	Sunshine	<ul style="list-style-type: none"> Have sunscreen available for ultraviolet protection. Have abundant water available to prevent dehydration. Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing. 	<ul style="list-style-type: none"> Ensure that sunscreen and water are available.
	Lightning	<ul style="list-style-type: none"> Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment. 	<ul style="list-style-type: none"> Obtain weather forecast and updates as needed.
	High winds	<ul style="list-style-type: none"> Wear goggles or safety glasses if dust or debris are visible. 	<ul style="list-style-type: none"> Review weather forecast prior to field work. Ensure that goggles or safety glasses are available.

Job Safety Analysis



Structure Inspection

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis



Sample and Laboratory Glassware Handling

Project Name: Lower Duwamish Waterway Remedial Design	Project Number: 180067-02.01	JSA Number: 009	Issue Date: October 28, 2019
Location: Seattle, Washington	Contractor: Anchor QEA, LLC	Analysis by: Sam Giannakos	Analysis Date: October 28, 2019
Work Operation: Sample and laboratory glassware handling	Superintendent/Competent Person: Fill in	Revised by: Fill in	Revised Date: Fill in
Required Personal Protective Equipment (PPE): <ul style="list-style-type: none"> Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD) 		Reviewed by: Fill in	Reviewed Date: Fill in
		Approved by: Fill in	Approved Date: Fill in

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Transporting and using glassware	Breakage of containers during field activities	<ul style="list-style-type: none"> Use appropriately sized tubs or bottle carriers with dividers to prevent bottle-to-bottle contact during transport. Consider using coated glassware, if practicable. Carry oversize bottles in tubs or bottle carriers using both hands during transfer to the sampling vessel and whenever the vessel is underway. 	<ul style="list-style-type: none"> Ensure dividers are sufficient and will remain in place during transport.
	Faulty glassware	<ul style="list-style-type: none"> Replace any glassware that is chipped, nicked, or cracked. 	<ul style="list-style-type: none"> Inspect glassware before use.
	Impact with equipment and other objects	<ul style="list-style-type: none"> Use care when loading and unloading sampling equipment. Minimize the handling of individual containers to the extent possible. 	
Filling sample containers	Over-tightening of bottle lids causing breakage	<ul style="list-style-type: none"> Avoid use of excessive force to tighten bottle caps (i.e., finger tight). Secure lids with clear tape to prevent opening during transport. 	
	Breakage during sample collection	<ul style="list-style-type: none"> Place containers in plastic tubs between aliquots to limit contact with hard surfaces. Place containers on a stable and non-slip surface during collection. Use the buddy system as needed to hold bottles during filling. 	

Job Safety Analysis



Sample and Laboratory Glassware Handling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Filling sample containers (continued)	Contact with sample preservatives (generally HCL or H ₂ SO ₄ to lower pH to less than 2)	<ul style="list-style-type: none">• Wear nitrile gloves and protective eyewear to prevent skin and eye contact if a container is damaged.• Do not open preserved bottles until necessary.	
Packing samples for shipment	Breakage during packing and shipment	<ul style="list-style-type: none">• Use bottle wraps, foam sleeves, or bubble wrap to prevent bottle contact in the cooler.• Pack coolers snugly, but do not over pack.	<ul style="list-style-type: none">• Ensure glass bottles do not touch to minimize potential breakage during transport.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including, but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.